

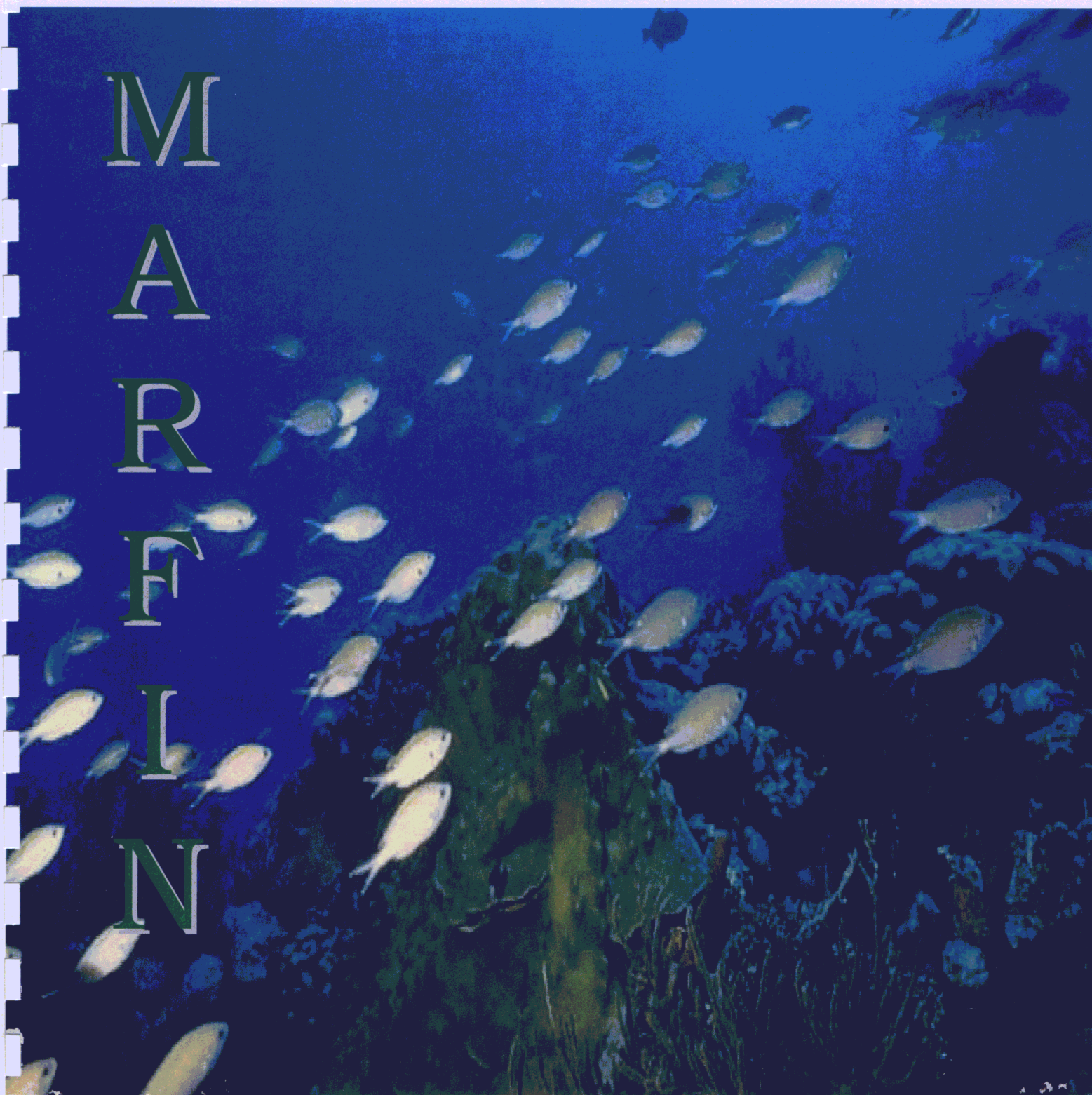
MARINE FISHERIES INITIATIVE



2002 ANNUAL REPORT

National Marine Fisheries Service
Southeast Region

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Marine Fisheries Initiative Program

(MARFIN)

2002 ANNUAL REPORT

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Prepared By:

Ellie F. Roche
and
Jeffrey E. Brown

State/Federal Liaison Office
National Marine Fisheries Service
9721 Executive Center Drive, North
Southeast Regional Office
St. Petersburg, Florida 33702
(727) 570-5324

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PREFACE

The Marine Fisheries Initiative (MARFIN) promotes and endorses programs which seek to optimize economic and social benefits from marine fishery resources through cooperative efforts that evoke the best research and management talents of the Southeast Region. Preference is given to cooperative planning efforts with up to 3-year time horizons. The intent is to focus projects funded by MARFIN into cooperative efforts that provide clear answers for fishery needs covered by the NMFS Strategic Plan¹. Goals one, two and four are particularly important. For example, a geographically restricted age and growth study of a local fishery resource is of limited value unless it is coordinated with, or verified by, similar studies which span the range of the resource. The value of such studies is also relatively limited unless the results can be combined with other studies to provide a regional assessment of the resource. MARFIN provides this necessary programmatic integration through cooperative planning, accomplishment of program activities and an annual MARFIN Conference.

The MARFIN program was created to bring together scientific, technical, industry, resource conservation, and management talents to conduct cooperative programs to facilitate and enhance the management of the marine fishery resources of the Gulf of Mexico and South Atlantic. MARFIN requires the timely dissemination of the results of both successful and unsuccessful efforts; therefore, each recipient of funding under this program is obligated to attend a MARFIN conference to report project findings. The bycatch issue remains a focal point of research needs for the Southeast Region. Critical reef fish fisheries are also being addressed, from efforts to reduce catches associated with shrimp trawls, to life history studies, as well as fishery-dependent and independent characterization work. Delineation of king mackerel stocks continues to be an area of important research effort toward mitigating management of this commercially and recreationally vital fishery. The MARFIN program also continues to diversify its research base and show its ability to respond to critical current fisheries issues by funding studies characterizing shark fisheries and providing basic biological information for responsible management of various shark species. Research on economic and sociological impacts of fisheries regulations illustrates the recognition by the MARFIN program that all aspects of a fishery must be understood to provide adequate fisheries management.

¹NMFS Strategic Plan Goals:

- Rebuild overfished marine fisheries;
- Maintain currently productive fisheries;
- Advance fishery forecasts and ecosystem models;
- Integrate conservation of protected species and fisheries management;
- Improve seafood safety;
- Protect living marine resource habitat;
- Improve the effectiveness of international fisheries relationships; and
- Reduce impediment to U.S. aquaculture.

HISTORY OF THE MARFIN PROGRAM

The MARFIN Program received its initial impetus from a 1983 discussion paper entitled: "Research Needs For Information Leading To Full and Wise Use of Fishery Resources In The Gulf of Mexico," by Dr. Thomas D. McIlwain of the Gulf Coast Research Laboratory while he was in the office of then Representative Trent Lott¹. This paper, sometimes referred to as the Lott-McIlwain paper, proposed an additional investment in fisheries research and development in the Gulf of Mexico to increase the economic contribution of marine fisheries, develop more valuable products from existing fisheries, develop export markets, forecast variation in yields and conserve and maintain presently exploited resources.

The next step in the evolution of MARFIN was the preparation and publication of the Marine Fisheries Initiative - Gulf of Mexico Phase². This publication, developed by a joint industry, federal, state and academic task force, detailed the research and development efforts necessary to enhance, restore and maintain fisheries in the Gulf of Mexico. The program focused on funding projects which had the greatest probability of maintaining and improving existing fisheries, increasing revenues for the domestic industry, increasing yields from fisheries and generating increased recreational opportunity and harvest potential. Projects were to be selected for funding on their likelihood of achieving these benefits through both short-term and long-term research with consideration of the magnitude of the eventual benefit that might be realized. Both short-term projects yielding immediate benefits and long-term projects were to receive high-priority emphasis. Planning emphasis was placed upon attaining priority goals either through a single project or a series of projects necessary to attain that goal.

In 1992, the MARFIN program was expanded to include a South Atlantic component (North Carolina, South Carolina, Georgia and the Atlantic coast of Florida). The goals and objectives of the South Atlantic Phase of MARFIN are described in Special Report No. 13 of the Atlantic States Marine Fisheries Commission, Marine Fisheries Initiative (MARFIN) South Atlantic Phase³.

The Lott-McIlwain paper and the Marine Fisheries Initiative publication were instrumental in gaining public support for the MARFIN program. On December 4, 1985, the conference report of the House and Senate that appropriated funds for the Departments of Commerce, Justice, State, the judiciary and related agencies for the fiscal year (FY) ending September 30, 1986, allocated \$2,850,000 for the MARFIN Program.

The following list represents funding for each year from the start of the MARFIN program until the current year:

- * Fiscal Year 1986 - \$2,850,000
- * Fiscal Year 1987 - \$3,500,000
- * Fiscal Year 1988 - \$3,500,000
- * Fiscal Year 1989 - \$3,000,000
- * Fiscal Year 1990 - \$3,000,000

- * Fiscal Year 1991 - \$2,986,000
- * Fiscal Year 1992 - \$4,000,000 (This includes \$500,000 of the South Atlantic MARFIN and \$1,300,000 for shrimp trawl bycatch studies.)
- * Fiscal Year 1993 - \$3,540,000
- * Fiscal Year 1994 - \$3,542,000
- * Fiscal Year 1995 - \$3,540,000
- * Fiscal Year 1996 - \$2,760,000 (No new projects were accepted during FY 1996 due to a reduction in congressional allocation, and because of the large number of active multi-year projects selected during previous funding cycles.)
- * Fiscal Year 1997 - \$3,000,000
- * Fiscal Year 1998 - \$3,000,000
- * Fiscal Year 1999 - \$3,000,000 (This includes \$500,000 for the Northeast Region.)
- * Fiscal Year 2000 - \$2,750,000 (No new projects were accepted during FY 2000 due to a reduction in congressional allocation, and because of the large number of active multi-year projects selected during previous funding cycles.)
- * Fiscal Year 2001 - \$3,500,000 (This includes \$250,000 for the Northeast Region and \$750,000 for red snapper research.)
- * Fiscal Year 2002 - \$3,500,000 (This includes \$250,000 for the Northeast Region and \$750,000 for red snapper research.)

MARFIN promotes and endorses programs which seek to optimize economic and social benefits from marine fishery resources through cooperative efforts that evoke the best research and management talents of the Southeast Region. The intent of the MARFIN program is to focus projects on key fisheries' issues in the southeast United States.

¹Office of Representative Trent Lott, Washington, DC; Dr. Thomas D. McIlwain; May 1983

²Gulf States Marine Fisheries Commission. P.O. Box 426, Ocean Springs, MS 39564; J.Y. Christman, D.J. Etzold, T.D. McIlwain, L.B. Simpson. Eds. January 1985

³Special Report No. 13 of the Atlantic States Marine Fisheries Commission; E.J. Joseph, V.G. Burrell, D.M. Cupka, P.J. Eldridge. August 1988

MARFIN PROGRAM ORGANIZATION AND ADMINISTRATION

The NMFS Southeast Regional Director reformed the MARFIN Panel in FY 1992 when the program was expanded to cover the South Atlantic (Appendix 1). Each member of the MARFIN Panel provides individual recommendations to the Regional Director on MARFIN priorities and financial assistance applications. The MARFIN Panel membership is as follows:

- One state marine conservation agency representative each, from the Gulf of Mexico and the South Atlantic areas.
- One representative each from the Gulf of Mexico and the South Atlantic commercial fishing industries.
- The Executive Directors of the Gulf of Mexico and South Atlantic Fishery Management Councils.
- The Executive Directors of the Gulf and Atlantic States Marine Fisheries Commissions.
- One representative each from the Gulf of Mexico and the South Atlantic recreational fishing industries.
- One representative each from the Gulf of Mexico and the South Atlantic Sea Grant Universities.
- A NMFS Southeast Fisheries Science Center Technical representative.
- The NMFS Southeast Region Program Officer acts as an advisor to the Regional Director and MARFIN Panel members concerning Federal, Department of Commerce and NOAA financial assistance administration requirements.

Alternate representatives to the MARFIN Panel serve when necessary. Individual Panel members are appointed by the NMFS Southeast Regional Director for staggered terms.

The Regional Director of the NMFS Southeast Regional Office (SERO) relies on recommendations from individual members of the MARFIN Panel, the MARFIN Scientific Panel, and the Regional Program Office in selecting each year's projects.

Each year the MARFIN Panel and NMFS administrators and scientists identify areas of emphasis for the next year's competitive financial assistance program. These areas of emphasis are published in the Federal Register for public comment. After public review and comment, an announcement of funding availability through the competitive MARFIN financial assistance program is published as a solicitation in the Federal Register.

The NMFS Southeast Regional State/Federal Liaison Office staff is responsible for the overall administration of all NMFS Southeast grants and cooperative agreement programs, including MARFIN (Appendix 2). Their responsibilities include planning, application and selection, negotiation, performance, monitoring and close-out of all assigned competitive and noncompetitive financial assistance programs. A NMFS Southeast Regional scientific or

technical expert is assigned as the Technical Monitor for each MARFIN project. The Technical Monitor is responsible to the State/Federal Liaison Office Program Officer for all technical and cooperative aspects of assigned projects (Appendix 3). The NOAA Grants Officer is responsible for the overall administration of each NMFS financial assistance award issued to recipients outside of the Federal government and cooperates with the NMFS Southeast Region State/Federal Liaison Office in administering each financial assistance award.

FY 2002 Program Highlights

- The Fourteenth Annual MARFIN Conference was held in Biloxi, Mississippi on December 10-11, 2002.
- Ecological factors limiting density and regulating growth and condition for gag grouper are being determined.
- Examination of factors resulting in release mortality of undersized red grouper, gag, red snapper and vermillion snapper are to be evaluated. Factors include depth caught and gear used.
- Movement patterns and spawning habitat of red hind grouper are being studied in a newly established Marine Fishery Reserve in the U.S. Virgin Islands.
- The biology of red snapper is being investigated by focusing on stock determination using otolith microchemistry and genetics.
- Technology transfer of new turtle excluder device modifications and updated bycatch reduction device information to the southeastern shrimp fishery.
- Demographics, density, and seasonal movement patterns of reef fish in the northeastern Gulf of Mexico associated with marine reserves.
- The effectiveness of Marine Reserve in restoring coastal food webs is being tested using the Special Protection Areas and an Ecological Reserve in the Florida Keys National Marine Sanctuary.
- Genetic analysis of wahoo, *Acanthocybium solandri*, stock structure in the western Atlantic and Gulf of Mexico is being conducted using nuclear and mitochondrial DNA markers.
- GIS analysis of fishery-dependent data in relation to definition of essential fish habitat, habitat areas of particular concern, and marine protected areas in the South Atlantic Bight.

Overview of Ongoing Research Projects

The following project description provides the title and objectives/goals of ongoing research funded through the MARFIN Program in the Southeast Region:

A. Bycatch

1. Shrimp trawl fisheries

a. "Enhancing industry contributions towards documentation of fishing effort and bycatch reduction in the shrimp fishery in the southeastern United States" - a one year, \$535,095 project to field test ten promising industry bycatch reduction devices (BRD). The testing will include underwater hydrodynamic performance tests, prototype BRD construction and tuning, and actual field certification testing aboard commercial shrimp trawls fishing within U.S. federal waters. **MARFIN Award NA17FF2009**

b. "Genetic impacts of shrimp trawling on Gulf red snapper" - a one year, \$68,825 project that will assay allelic variations at 20 nuclear-encoded microsatellites from samples taken during shrimp trawling and representing five subregions in the northern Gulf of Mexico, determine whether juveniles taken as bycatch represent random samples of genotypes within each subregion, and determine whether red snapper assemblages in the five subregional localities are increasing or decreasing in effective population size. **MARFIN Award NA17FF2014**

c. "Behavior and swimming performance of red snapper, *Lutjanus campechanus*: Its application to bycatch reduction"- the first year of a three year, \$212,997 project to consider the effects of size, season, and time of day on red snapper behavior and swimming. With the aim of using this information to produce more effective bycatch reduction. In addition the project will evaluate a vortex generating bycatch reduction device to assess its ability to reduce capture of juvenile red snapper during shrimp trawl operations. **MARFIN Award NA17FF2031**

d. "Technology transfer of new turtle excluder device modifications and updated bycatch reduction device information to the southeastern shrimp fishery" - a one year, \$171,000 project that will provide the shrimping industry with a clear description of new TED regulations and provide information on new BRDs as well as the status of prototype gears being tested. Meeting and workshops will be conducted from North Carolina through Texas, using Foundation specialists, to provide up to date information to shrimp fishermen, net shop owners, and other interested parties. **MARFIN Award NA17FF2867**

2. Reef fish fisheries

a. "Evaluation of the efficacy of current minimum size regulations for selected reef fish based on release mortality and fish physiology" - the first year of a two year, \$359,804 project that will determine if red grouper are more susceptible to depth-induced mortality than red snapper, test whether smaller red grouper survive rapid decompression better than larger red grouper, and to obtain catch and release mortality rates for red grouper, red snapper, vermilion snapper, and mangrove snapper. The first two areas of investigation will center around the swim

bladder's size and structures such as the bundles of rete mirabile and the amount of gas gland cells. **MARFIN Award NA17FF2010**

c. "Estimating discard rate and release mortality of red snapper in Texas fisheries" - the first year of a three year, \$354,244 project to estimate delayed release mortality of red snapper under controlled conditions and find physiological indicators of delayed release mortality using blood samples from caught fish. Using this information the project will also estimate the discard rate and delayed release mortality in commercial and recreational fisheries. In addition released red snapper will also be tagged to estimate recapture rate by the fisheries. **MARFIN Award NA17FF2012**

B. Reef Fish

1. Basic biological data

a. "Ecological factors limiting density and regulating growth and condition for gag grouper: A definitive test for the role of shelter" - the second year of a two year, \$175,158 project to determine if reef habitat, specifically available shelter, limits local densities of gag grouper and thereby regulates the growth and condition of gag on the shallow continental shelf. Reef shelter will be manipulated in a field experiment involving intensive non-destructive sampling of experimental reefs. **MARFIN Award NA97FF0350**

b. "Validation of ages for species of the deepwater snapper/grouper complex off the coast of the southeastern United States" - the first year of a two year, \$69,463 project to validate increment counts from otolith sections of tilefish, snowy grouper, blackbelly rosefish, blueline tile fish and wreckfish using accelerator mass spectrometry analysis of delta 14C present in otoliths. Validation of increment counts as a n estimate of age is critical if any age-structured management is used for a species. **MARFIN Award NA17FF2870**

c. "Red snapper *Lutjanus campechanus* in the northern Gulf of Mexico: Age and size composition of the commercial harvest and mortality of regulatory discards" - the first of a three year, \$298,016 project to obtain length and ages of red snapper randomly selected from the commercial fishery in the northern Gulf of Mexico which will allow the description of the size and age composition of the harvest. Observers on board commercial vessels will qualitatively assess release mortality of red snapper regulatory discards. **MARFIN Award NA17FF2007**

d. "The use of lipofuscin for aging Caribbean spiny lobster (*Panulirus argus*) - the first year of a two year, \$115,281 project to make an accurate determination of the ages of lobsters from the Florida Keys and Dry Tortugas to develop a complete growth curve and age-length keys. Lobsters of known age will be used to calibrate the age-length keys. Knowledge gained on this species general growth parameters will be used in fisheries management. **MARFIN Award NA17FF2871**

2. Population assessment of reef fish

a. "Stock structure of red snapper in the northern Gulf of Mexico: Is their management as a single unit stock justified based on otolith microchemistry?" - the third year of a three year,

\$187,356 project to determine the relative contributions of regional nursery areas to contemporary, offshore adult congregations, to determine long term movement and mixing rates of red snapper across the region, and to determine the nursery of origin of juvenile red snapper taken in shrimp trawls. Otolith microchemistry, as determined by inductively coupled - plasma mass spectrometry, will be used to link fish with nursery habitats. **MARFIN Award NA87FF0425**

b. "Stock structure of red snapper in the northern Gulf of Mexico: Is their management as a single unit stock justified based on genetic variation?" - the third year of a three year, \$404,534 project to determine whether independent genetic subpopulations of red snapper exist in the northern Gulf, determine the number of breeders at different localities across the region and to determine whether changes in patterns of genetic variation and effective population size over decadal time scales are consistent with the hypothesis that stock size has decreased significantly the last two to three decades. The project will also examine red snapper taken as shrimp bycatch to add a new dimension to assessment of the impact this fishery has on red snapper. **MARFIN Award NA87FF0426**

c. "Stock structure of red porgy, *Pagrus pagrus*, in the North Atlantic" - the first year of a three year, \$280,092 project to determine stock identification in red porgy by examining variation in mtDNA and nuclear microsatellites. Samples will be taken in the South Atlantic Bight, which has been over-fished for red porgy, and in the Gulf of Mexico, where red porgy populations are in better condition. **MARFIN Award NA17FF2008**

d. "Stable isotopes as tracers of patterns in habitat utilization by juvenile red snapper" - a one year, \$44,823 project that will use stable isotopic composition of red snapper tissues as chemical tracers of food web dynamics and dietary shifts. The project will examine juvenile red snapper collected over open sand bottom, low-relief shell rubble reefs, and artificial reefs to determine if the stable isotope composition (Carbon 13 and Nitrogen 15) differ among these habitats. **MARFIN Award NA17FF2875**

e. "Demographics, density, and seasonal movement patterns of reef fish in the northeastern Gulf of Mexico associated with marine reserves" - the first year of a two year, \$373,531 project to characterize population parameters of all fisheries species associated with the Madison-Swanson and Steamboat Lumps Fishery Reserves on the eastern Gulf of Mexico shelf edge. Fish species demographics, density, and seasonal movements will be studied in the reserves and outside the reserves to allow for the comparison of fishing effects on these characteristics. **MARFIN Award NA17FF2876**

3. Management of reef fish

a. "Partitioning release mortality in the undersized red snapper bycatch: Comparison of depth vs. hooking effect" - the second year of a two year, \$116,871 project to compare factors possibly leading to release mortality in red snapper. The project will use hyperbaric chambers to simulate field conditions in the lab to investigate the effects of rapid pressure changes on red snapper physiology. Red snapper caught aboard charter boats, head boats, and recreational vessels will be caught using circle and J hooks and tagged. Returns captures will be compared to determine hook mortality. **MARFIN Award NA97FF0349**

b. "Can Marine Protected Areas conserve genetic diversity in tomtate, *Haemulon aurolineatum*, and French grunt, *H. flavolineatum*?" - the first year of a three year, \$281,889 project to assess the levels of genetic variation within and among populations of tomtate and French grunts using mitochondrial and nuclear DNA. This project will also evaluate the degree of population isolation in light of the requirements of current ecological models evaluating the impact of MPAs. **MARFIN Award NA17FF2878**

c. "An economic analysis of fleet dynamics in the Gulf of Mexico grouper fishery" - the first year of a two year, \$208,980 project that will determine the active population of Gulf grouper vessels and analyze the factors determining gear choice decisions. The project will also identify the impacts of overall level of effort, fleet characteristics, and relevant regulatory and economic factors on the seasonal and spatial distribution of fishing effort targeting the Gulf grouper complex and analyze the impacts of alternative management policies on grouper harvests and production technology. **MARFIN Award NA17FF2879**

4. Evaluation of marine reserves as a fishery management tool

a. "Investigating movement patterns and spawning habitat of red hind grouper in a newly established Marine Fishery Reserve in the U.S. Virgin Islands" - the second year of a two year, \$141,423 project to visually survey reef fish population structure and density of red hind grouper spawning aggregations. An intensive tag/release/recapture and sonic tagging program will also be undertaken to identify the source of groupers coming to the spawning sites. **MARFIN Award NA97FF0348**

b. "Marine Reserve effectiveness in restoring coastal food webs: An experimental test using the Special Protection Areas and an Ecological Reserve in the Florida Keys National Marine Sanctuary" - the first year of a two year, \$183,578 project to examine the impacts of large piscivorous fishes on food web structure in and around coral reefs, the importance of linkages among seagrass and coral reefs in the re-establishment of these food webs, and the effects of habitat structure on the success of marine reserves. The project will take advantage of the rare opportunity to use replicated 'no-take' (predator rich) and unprotected (predator poor) reefs in the Florida Keys National Marine Sanctuary. **MARFIN Award NA17FF2015**

C. Red Snapper Research

1. Red snapper bycatch

a. "Geographic comparison of age, growth, reproduction, movement, and survival of red snapper off the state of Florida" - the first year of a three year, \$623,161 project that will examine several factors affecting bycatch mortality. The project will specifically test whether circle hooks reduce release mortality in red snapper and the effects of depth and gear on release mortality. In addition the project will determine tag retention and obtain movement patterns for red snapper in the Gulf of Mexico and the southern U.S. Atlantic. **MARFIN Award NA17FF2881**

2. Red snapper biological information

a. "Assessment of bathymetric highs as nursery habitat of newly settled red snapper" - the first year of a three year, \$211,469 project to couple active acoustic surveys with trawling data to provide fine scale resolution of habitat utilization by new recruits. The project will also combine estimates of growth and abundance to predict recruitment potential of juvenile fish from different bathymetric highs as well as different habitat types. **MARFIN Award NA17FF2872**

3. Red snapper population assessment

a. "Development of assays for major histocompatibility complex (MHC) Class I and Class II loci in Gulf red snapper for use in stock structure analysis and assessment of genetic health" - the first year of a two year, \$68,700 project to develop PCR primers that optimize identification of orthologous from paralogous major histocompatibility complex genes in Gulf red snapper. The long term goal of the project is to use genetic tools developed in studies of stock structure and immune response capability to resist parasites, pathogens, and other cytotoxic challenges. **MARFIN Award NA17FF2880**

4. Management of red snapper

a. "Linking spatial-temporal population size structures and fishing effort dynamics to assess the effectiveness of minimum size for red snapper management" - the first year of a two year, \$171,143 project to develop a state-of-the-art size-structures yield per recruit model for use in an assessment of the effectiveness of using minimum size as a viable red snapper management option. The project will provide regional and sub-regional perspective of exploitation impacts under minimum size framed by seasonal quota constraints. **MARFIN Award NA17FF2865**

b. "Bioeconomic analysis of the red snapper rebuilding plan and transferable rights policies in the Gulf of Mexico" - the first year of a two year, \$122,319 project to modify the General Bioeconomic Fisheries Simulation Model to include five vessel classes that fish for red snapper. The model will be calibrated with the most recent data for shrimp, red snapper, and vermillion snapper and then analysis will be conducted on the proposed red snapper rebuilding plan alternative. **MARFIN Award NA17FF2873**

D. Coastal Migratory Pelagic Fisheries

a. "Renewal of an observer program to monitor the directed commercial shark fishery in the Gulf of Mexico and the South Atlantic" - a one year, \$149,910 project to re-establish and expand a cooperative shark resource data collection system designed to enhance the reliability of management strategies for the shark fisheries in the southeastern U.S. This project will provide baseline characterization data on the species composition, relative abundance, and size composition within species for coastal shark species groups by depth and season in each regional fishery. **MARFIN Award NA97FF0041**

b. "Stock structure of dolphin, *Coryphaena hippurus*, in the western central Atlantic as determined by molecular genetic techniques" - the second year of a three year, \$263,280 project to identify the stock structure of dolphin in the west central Atlantic using genetic analysis of

mitochondrial and nuclear DNA. The project will examine the genetic variation within and among populations of dolphin and will test the hypothesis that two distinct populations or stocks exist in the region. Mitochondrial DNA will be analyzed by restriction endonuclease digestion of the ND-1 region. Sampling will include northern and southern aggregations in the west central Atlantic. **MARFIN Award NA87FF0427**

c. "Discrimination among U.S. South Atlantic and Gulf of Mexico king mackerel stocks with otolith shape Analysis and otolith microchemistry" - the first year of a two year. \$168,070 project to develop natural tags based on otolith microchemistry and shape analysis that will be used to estimate the relative contribution of each stock to the winter fishery off southeastern Florida and establish methods enabling annual estimation of stock mixing to facilitate more effective management of U.S. king mackerel stocks. **MARFIN Award NA17FF2013**

d. "Fishery and population characteristics of wahoo, *Acanthocybium solandri*, in Florida and adjacent waters of the western North Atlantic Ocean" - the first year of a three year. \$182,701 project to summarize available fishery data for wahoo, complete a bag limit analysis, and synthesize new and published information about wahoo life history. Wahoo will be collected throughout the year from various fishing ports in Florida. Fish sizes will be related to sex and age and fecundity will be estimated from weighed sub-samples of oocytes in final maturation. **MARFIN Award NA17FF2882**

e. "Genetic analysis of wahoo, *Acanthocybium solandri*, stock structure in the western Atlantic and Gulf of Mexico by means of nuclear and mitochondrial DNA markers" - the first year of a two year, \$165,276 project to resolve stock questions about wahoo utilizing seven demonstrated high resolution genetic makers. The direct results of this study will be a comprehensive genetic survey of wahoo encompassing its distribution and thereby provide one of the essential foundations for this species management. **MARFIN Award NA17FF2886**

E. Groundfish and Estuarine Fishes

a. "Identifying spawning grounds and classifying nursery habitat for red drum *Sciaenops ocellatus* in Pamlico Sound, NC " - the first year of a two year, \$324,295 project to delineate spawning grounds in select regions in Pamlico Sound and classify nursery grounds by determining whether there are unique microchemical signatures in the otoliths of juvenile red drum captured in habitats fringing Pamlico Sound. The project will determine if adults exploit both the river mouth and tidal pass inlet habitats for spawning and examine the microchemical characteristics of the otolith core of young of the year red drum to identify the salinity of water at time of hatching. **MARFIN Award NA17FF2883**

b. "Red drum in South Carolina waters: The use of bottom longline gear to develop indices of relative abundance of adults in coastal and nearshore waters" - a one year, \$75,679 project to use fishery independent longline sampling to develop catch per unit effort, size, sex, and age composition data and to tag adult red drum for the collection of migratory and stock identification data. The project will also tag and measure small sharks caught incidentally to red drum sampling for inclusion in the Cooperative Atlantic States Shark Pupping and Nursery Survey data base. **MARFIN Award NA17FF2884**

c. "Atlantic croaker, *Micropogonias undulatus*, along the middle Atlantic coast and southeast coast of the United States" - the first year of a three year, \$223,732, project to obtain life history information, including abundance and distribution, on Atlantic croaker off the middle and south Atlantic states. The project will re-evaluate the interpretations of transverse sections of sagittal otoliths for age determination, calculate growth equations from size-at-age data, and generate cohort-specific indices of abundance. **MARFIN Award NA17FF2885**

F. Essential Fish Habitat

2. Develop scientific data to allow identification of EFH for Federally managed species

a. "Relationships between estuarine habitat structure and the spatial distribution and abundance of juvenile fishery species in Charlotte Harbor, Florida" - a one year, \$41,153 project to identify relationships between distribution and abundance of selected fishery species and habitat structure on a estuary-wide basis. The project will create a GIS model to predict the abundance of juvenile fishery species over shallow portions of an estuary using identified associations with habitat structure and environmental variables. **MARFIN Award NA17FF2866**

4. Develop GIS mapping protocols to allow the presentation of EFH and HAPC

a. "GIS analysis of fishery-dependent data in relation to definition of essential fish habitat, habitat areas of particular concern, and marine protected areas in the South Atlantic Bight" - the first year of a two year, \$193,786 project that will employ MARMAP fishery-independent trawl data to develop a GIS for the continental shelf and upper slope from Cape Hatteras, NC to West Palm Beach, FL. The GIS will examine historical and current databases for areas that might be considered Essential Fish Habitat, Habitat Areas of Particular Concern, and Marine Protected Areas. **MARFIN Award NA17FF2874**

G. General

a. "An integrated economic analysis of alternative bycatch, commercial, and recreational policies for the recovery of the Gulf of Mexico red snapper" - a one year, \$88,589 project to conduct an economic analysis of alternative policies aimed at increasing red snapper stock levels in the Gulf of Mexico. The specific objectives include modifying the General Bioeconomic Fisheries Simulation Model (GBFSM) to include fractional license and fractional gear policies in the shrimp fishery, based on the GBFSM, developing a dynamic optimization model that incorporates a sustainability criterion, and estimating the increase in red snapper stocks associated with alternative fixed and flexible bycatch and red snapper policies. **MARFIN Award NA87FF0420**

b. "Intercept surveys of recreational spiny lobster fishermen in the Florida Keys" - a one year, \$39,017 project to acquire information on the recreational spiny lobster fishery by conducting intercept interviews. The study will collect catch, effort, and demographic data that will be used to evaluate the accuracy of similar data generated by the Florida Fish and Wildlife Conservation Commission (FWC) mail surveys. Results from the intercept survey will aid the

FWC in developing management options for limiting the potential growth in this fishery.
MARFIN Award NA17FF2011

c. "An intertemporal and spatially dynamic supply model of the Gulf of Mexico shrimp fleet for use in management and bycatch reduction" - the first year of a three year, \$287,233 project to develop defensible parameter estimates that can assist in explaining changes in the behavior of shrimp fishermen in relation to economic stimuli and/or potential management measures. The changes in the behavior of shrimp fishermen in response to economic stimuli and management measures will first be derived using microeconomic and economic considerations. These parameter estimates will then be used to develop a joint production function that will allow the examination of expected changes in bycatch in relation to changes in behavior of shrimp fishermen due to changes in economic stimuli or management measures. **MARFIN Award NA17FF2868**

d. "Economic valuation of marine reserves in the Florida Keys as measured by diver attitudes and preferences: Implications for valuation of non-consumptive use of marine resources" - the first year of a two year, \$87,723 project to determine the value of a non-consumptive activity, diving, on a marine reserve and to identify the factors that either enhance or reduce marine reserve value. The project will determine the monetary value divers place on individual marine reserves in the Florida Keys and rank the attributes offered by the marine reserves that enhance diver visitation and satisfaction. **MARFIN Award NA17FF2869**

e. "Factors affecting participation in marine fisheries: case studies in Georgia and North Carolina" - the first year of a two year, \$129,221 project to identify factors in two counties (McIntosh, GA, and Brunswick, NC) that have motivated commercial fishers to leave the industry and recreational fishers to begin fishing for sport and leisure. Interviews will be conducted with a total of approximately 5,500 individuals during the two year project. **MARFIN Award NA17FF2877**

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Appendix 1: MARFIN PANEL MEMBERS

Dr. Robert Stickney
Gulf of Mexico Sea Grant Representative
Texas Sea Grant College Program
2700 Earl Rudder Freeway South
College Station, TX 77845

Mr. Julius Collins
Gulf of Mexico Commercial Representative
163 Creekbend Drive
Brownsville, TX 78521

Mr. James Franks
Gulf of Mexico Recreational Representative
Gulf Coast Research Laboratory
703 East Beach Drive
Ocean Springs, MS 39566

Mr. Larry B. Simpson
Gulf States Marine Fisheries Commission Representative
Gulf States Marine Fisheries Commission
2404 Government Street
Ocean Springs, MS 39564

Mr. Wayne Swingle
Gulf of Mexico Fishery Management Council Representative
Gulf of Mexico Fishery Management Council
3018 U.S. Hwy. 301 N., Suite 1000
Tampa, FL 33619

Mr. William (Corky) S. Perret
Gulf States Representative
MS Department of Marine Resources
1141 Bayview Ave., Suite 101
Biloxi, MS 39530

Mr. Benjamin Hartig III
South Atlantic Commercial Representative
9277 SE Sharon Street
Hobe Sound, FL 33455

Appendix 1 (CONT): MARFIN PANEL MEMBERS

Mr. Robert Mahood
South Atlantic Fisheries Management Council Representative
1 Southpark Circle
Suite 306
Charleston, SC 29407-4699

Dr. Louis Daniel
South Atlantic State Representative
NC Dept. of Environment, Health & Natural Resources
3441 Arendell Street
Morehead City, NC 28557

Dr. Lisa Kline Desfosse (Alternate)
Atlantic States Marine Fisheries Commission Representative
1444 Eye Street, N.W.
Sixth Floor
Washington, D. C. 20035

Dr. Mac Rawson
South Atlantic Sea Grant Representative
University of Georgia
Marine Science Building, Room 220
Athens, GA 30602

Mr. Wayne Lee
South Atlantic Recreational Representative
300 Raymond Avenue
Kil Devil Hills, NC 27948

Dr. Scott Nichols
NMFS Technical Representative
Laboratory Director
National Marine Fisheries Service
3209 Frederic Street
Pascagoula, MS 39567

Appendix 2: NMFS SOUTHEAST REGIONAL MARFIN ADMINISTRATIVE STAFF

Ellie Francisco Roche
Chief, State/Federal Liaison Office
National Marine Fisheries Service
9721 Executive Center Drive North
St. Petersburg, FL 33702

Jeffrey E. Brown
Fisheries Grants Specialist
Fishery Biologist
State/Federal Liaison Office
National Marine Fisheries Service
9721 Executive Center Drive North
St. Petersburg, FL 33702

Cynthia T. Binkley
Fisheries Grants Specialist
State/Federal Liaison Office
National Marine Fisheries Service
9721 Executive Center Drive North
St. Petersburg, FL 33702

Scot B. Plank
Fisheries Grants Specialist
State/Federal Liaison Office
National Marine Fisheries Service
9721 Executive Center Drive North
St. Petersburg, FL 33702

Rita F. Daniels
Grants Assistant
State/Federal Liaison Office
National Marine Fisheries Service
9721 Executive Center Drive North
St. Petersburg, FL 33702

Appendix 3: NMFS TECHNICAL MONITORS

Dr. Jose Castro	Miami Laboratory
Dr. Jean Cramer	Miami Laboratory
Ms. Nancie Cummins	Miami Laboratory
Mr. Douglas A. Devries	Panama City Laboratory
Dr. Pete Eldridge	Southeast Regional Office
Mr. Daniel Foster	Mississippi Laboratory
Mr. Gregg Gitschlag	Galveston Laboratory
Dr. Chris Gledhill	Mississippi Laboratory
Mr. Douglas E. Harper	Miami Laboratory
Dr. Stephen Holiman	Southeast Regional Office
Dr. Gene Huntsman	Beaufort Laboratory
Dr. Allyn G. Johnson	Panama City Laboratory
Dr. Dennis Lee	Miami Laboratory
Dr. John Merriner	Beaufort Laboratory
Dr. James Nance	Galveston Laboratory
Dr. Clay Porch	Panama City Laboratory
Dr. Allyn Powell	Beaufort Laboratory
Dr. Eric D. Prince	Miami Laboratory
Mr. William Richards	Miami Laboratory
Ms. Elizabeth Scott-Denton	Galveston Laboratory
Mr. Joseph W. Smith	Beaufort Laboratory
Mr. Mike Travis	Southeast Regional Office
Dr. Douglas S. Vaughan	Beaufort Laboratory
Dr. John Vondruska	Southeast Regional Office
Dr. James Waters	Beaufort Laboratory
Mr. John Watson	Mississippi Laboratory
Mr. Wayne N. Witzell	Miami Laboratory
Dr. Cheryl Woodley	Charleston Laboratory
Ms. Zoula Zein-Eldin	Galveston Laboratory
Dr. Roger Zimmerman	Galveston Laboratory

Appendix 4 - Federal Register Notice
Volume 66, Number 199
October 15, 2001

DEPARTMENT OF COMMERCE**National Oceanic and Atmospheric Administration**

[Docket No. 001214350-1240-02, I.D. 082701G]

RIN 0648-ZB08

Financial Assistance for Research and Development Projects in the Gulf of Mexico and Off the U.S. South Atlantic Coastal States; Marine Fisheries Initiative (MARFIN)

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of solicitation for applications.

SUMMARY: Subject to the availability of funds, NMFS (hereinafter referred to as "we" or "us") announces the availability of Federal assistance under the Marine Fisheries Initiative (MARFIN) Grant Program. This announcement provides guidelines, evaluation criteria and selection procedures for the program.

Under the MARFIN program, we provide financial assistance for research and development projects that optimize the use of fisheries in the Gulf of Mexico and off the South Atlantic States of North Carolina, South Carolina, Georgia, and Florida involving the U.S. fishing industry (recreational and commercial), including fishery biology, resource assessment, socio-economic assessment, management and conservation, selected harvesting methods, and fish handling and processing.

DATES: We must receive your application by close of business (5 p.m. eastern daylight time on December 14, 2001. Applications received after that time will not be considered for funding.

ADDRESSES: You can obtain an application package from, and send your completed applications(s) to: Ellie Francisco Roche, Chief, State/Federal Liaison Office, Southeast Regional Office, NMFS, 9721 Executive Center Drive, N., St. Petersburg, FL 33702. You may also obtain the application package from the MARFIN Home Page at: <http://caldera.sero.nmfs.gov/grants/programs/marfin>.

You must submit one signed original and nine signed copies of the completed application (including supporting information). We will accept neither facsimile applications, nor electronically forwarded applications.

FOR FURTHER INFORMATION CONTACT: Ellie Francisco Roche, Chief, State/Federal Liaison Office, (727) 570-5324.

SUPPLEMENTARY INFORMATION:**I. Introduction****A. Background**

MARFIN is a competitive Federal assistance program that funds projects seeking to optimize research and development benefits from U.S. marine fishery resources through cooperative efforts involving the best research and management talents to accomplish priority activities. Projects funded under MARFIN provide answers for fishery needs covered by the NMFS Strategic Plan, available from the Southeast Regional Office (see **ADDRESSES**), particularly those goals relating to: rebuilding over-fished marine fisheries, maintaining currently productive fisheries, and integrating conservation of protected species and fisheries management. Areas of emphasis for MARFIN are formulated from recommendations received from non-Federal scientific and technical experts and from NMFS' research and operations officials.

B. Funding

We are soliciting applications for Federal assistance pursuant to 15 U.S.C. 713c-3(d). This document describes how you can apply for a grant or cooperative agreement under the MARFIN Grant Program and how we will determine which applications we will fund.

Approximately \$2.0 million may be available in fiscal year (FY) 2002 for funding projects. This amount includes possible in-house projects and \$750,000 for 1-year projects for red snapper research. (See II. Funding Priorities.) Publication of this notice obligate's neither NMFS to award any specific grant or cooperative agreement nor all or any parts of the available funds.

Project proposals accepted for funding for a project period over 1 year that include multiple project components and severable tasks to be funded during each budget period do not compete for funding in subsequent budget periods within the approved project period. However, funding for subsequent project components is contingent upon the availability of funds and satisfactory performance and is at the sole discretion of the agency.

C. Catalog of Federal Domestic Assistance

This program is described in the "Catalog of Federal Domestic Assistance" under program number 11.433, Marine Fisheries Initiative (MARFIN).

II. Funding Priorities

Your proposal must address one of the priorities listed below as they pertain to federally managed species or species relevant to Federal fisheries management. If you select more than one priority, you should list first on your application the priority that most closely reflects the objectives of your proposal.

Highest consideration is given to funding projects that have the greatest probability of recovering, maintaining, improving, or developing fisheries; improving the understanding of factors affecting recruitment success; and/or generating increased values and recreational opportunities for fisheries. Projects are evaluated as to the likelihood of achieving these objectives, with consideration of the magnitude of the eventual economic or social benefits that may be realized. Priority is given to funding projects in the subject areas listed in this section, but proposals in other areas are considered on a funds-available basis. There is no preference between short-term and long-term projects.

A. Bycatch

The bycatch of biological organisms (including interactions with sea turtles and marine mammals) by various fishing gears can have wide-reaching impacts from a fishery's management and an ecological standpoint, with the following major concerns:

1. *Shrimp trawl fisheries.* Studies are needed to contribute to the regional shrimp trawl bycatch program (including the southern U.S. Atlantic rock shrimp fishery) being conducted by NMFS in cooperation with state fisheries management agencies, commercial and recreational fishing organizations and interests, environmental organizations, universities, Councils, and Commissions. Specific guidance and research requirements are contained in the Cooperative Bycatch Plan for the Southeast, available from NMFS (see ADDRESSES). In particular, the studies should address:

- (a) Data collection and analyses to expand and update current bycatch estimates, temporally and spatially emphasizing areas of greatest impact by shrimping. Sampling effort should include estimates of numbers, weight, and random samples of size (age) structure of associated bycatch complex, with emphasis on those overfished species under the jurisdiction of the Councils. Data collection should also include mortality, age, and length

information for red drum in both inshore and offshore shrimp fisheries.

- (b) Assessment of the status and condition of fish stocks significantly impacted by shrimp trawler bycatch, with emphasis given to overfished species under the jurisdiction of the Councils. Other sources of fishing and nonfishing mortality should be considered and quantified as well.

- (c) Identification, development, and evaluation of gear, non-gear, and tactical fishing options to reduce bycatch.

- (d) Improved methods for communicating with and improving technology and information transfer to the shrimp industry.

- (e) Development and evaluation of statistical methods to estimate the bycatch of priority management species in the Gulf and South Atlantic shrimp trawl fisheries.

2. *Pelagic longline fisheries.* Several pelagic longline fisheries exist in the Gulf and South Atlantic, targeting highly migratory species, such as tunas, sharks, and swordfish. Priority areas include:

- (a) Development and evaluation of gear and fishing tactics to minimize bycatch of undersized and unwanted species, including sea turtles, marine mammals, billfish, and overfished finfish species/stocks.

- (b) Assessment of the biological impact of longline bycatch on related fisheries.

3. *Reef fish fisheries.* The reef fish complex is exploited by a variety of fishing gear and tactics. The following research on bycatch of reef fish species is needed:

- (a) Development and evaluation of gear and fishing tactics to minimize the bycatch of undersized and unwanted species, including sea turtles and marine mammals.

- (b) Characterization and assessment of the impact of bycatch of undersized target species, including release mortality, during recreational fishing and during commercial longline, bandit gear and trap fishing.

- (c) Determination of the release mortality by depth of red snapper caught on commercial bandit rigs that are electrically or hydraulically powered.

4. *Finfish trawl fisheries.* Studies are needed on quantification and qualification of the bycatch in finfish trawl fisheries, such as the flounder and fly-net fisheries in the South Atlantic.

5. *Gillnet fisheries.* Studies are needed on quantification and qualification of the bycatch in coastal and shelf gillnet fisheries for sciaenids, scombrids, bluefish, monkfish, and dogfish sharks of the South Atlantic and Gulf of Mexico (particularly interaction with

sea turtles and marine mammals). Development and evaluation of gear and fishing tactics to minimize bycatch of undersized and non-target species, including marine mammals and sea turtles, is also needed.

6. *Economic considerations of bycatch reduction.* (a) Develop and test models, using actual or hypothesized data, that explicitly consider the economic impacts to the directed fishery and gains to the bycatch fishery. The models should include the effects of the management systems for the directed and bycatch fisheries and should attempt to describe criteria for the correct level of bycatch reduction (e.g., marginal cost and value of reduction are equal).

- (b) Develop economic incentives and other innovative alternatives to gear and season/area restrictions as ways to reduce bycatch. The proposal should attempt to contrast the relative costs, potential gains, and level of bycatch reduction associated with traditional methods and any innovative alternatives addressed by the proposal.

- (c) Describe the costs and returns performance of South Atlantic and Gulf of Mexico shrimp fisheries as necessary background for the economics of bycatch reduction. (See Section V.C.1., regarding collection of information.)

B. Reef Fish

Some species within the reef fish complex are exhibiting signs of being overfished, either because of directed efforts or because of being the bycatch of other fisheries. The ecology of reef fish makes them vulnerable to overfishing, because they tend to concentrate over specific types of habitat with patchy distribution. This behavior pattern can make traditional fishery statistics misleading. Priority research areas include:

1. *Collection of basic biological data for species in commercially and recreationally important fisheries.* (a) *Age and growth of reef fish.* (1) Description of age and growth patterns, especially for red, vermilion, gray, and cubera snappers; gray triggerfish; gag; black grouper; hogfish; red porgy; and other less dominant forms in the management units for which data are lacking.

- (2) Contributions to the development of annual age-length keys and description of age structures for exploited populations for all species in the complex addressed in the Reef Fish and Snapper/Grouper Management Plans for the Gulf and South Atlantic, respectively, prioritized by importance in the total catch.

(3) Design of sampling systems to provide a production-style aging program for the reef fish fishery. Effective dockside sampling programs are needed over a wide geographic range, especially for groupers, to collect information on reproductive state, size, age, and sex.

(b) *Reproduction studies of reef fish.*

(1) Maturity schedules, fecundity, and sex ratios of commercially and recreationally important reef fish, especially gray triggerfish, gag, and red porgy in the Gulf and South Atlantic.

(2) Studies of all species to characterize the actual reproductive contribution of females by age.

(3) Identification and characterization of spawning aggregations by species, area, size group and season.

(4) Effects of fishing on changes of sex ratios for gag, red grouper, and scamp, and disruption of aggregations.

(5) Investigations of the reproductive biology of gag, red grouper and other grouper species.

(c) *Recruitment of reef fish.* (1) Source of recruitment in Gulf and South Atlantic waters, especially for snappers, groupers, and amberjacks.

(2) Annual estimation of the absolute or relative recruitment of juvenile gag, gray snapper, and lane snapper to estuarine habitats off the west coast of Florida and to similar estuarine nursery habitats along the South Atlantic Bight; development of an index of juvenile gag recruitment for the South Atlantic based on historical databases and/or field studies.

(3) The contribution of live-bottom habitat and habitat areas of particular concern (*Oculina* banks) off Fort Pierce, Florida and off west central Florida to reef fish recruitment.

(d) *Stock structure of reef fish.* (1) Movement and migration patterns of commercially and recreationally valuable reef fish species, especially gag in the Gulf and South Atlantic and greater amberjack between the South Atlantic and Gulf.

(2) Biochemical/immunological and morphological/meristic techniques to allow field separation of lesser amberjack, almaco jack, and banded rudderfish from greater amberjack to facilitate accurate reporting of catch.

(3) Stock structure of greater amberjack in the Gulf and South Atlantic.

(4) Fishery dependent and fishery independent data of wreckfish from the eastern North Atlantic.

2. *Population assessment of reef fish.*

(a) Effect of reproductive mode and sex change (protogynous hermaphroditism) on population size and characteristics, with reference to sizes of fish exploited

in the fisheries and the significance to proper management.

(b) Source and quantification of natural and human-induced mortalities, including release mortality estimates for charter boats, headboats, and private recreational vessels, especially for red snapper and the grouper complex.

(c) Determination of the habitat and limiting factors for important reef fish resources in the Gulf and South Atlantic.

(d) Description of habitat and fish populations in the deep reef community and the prey distributions supporting the community.

(e) Development of statistically valid indices of abundance for important reef fish species in the South Atlantic and Gulf, especially red grouper, Goliath grouper, speckled hind, red porgy, Warsaw grouper and Nassau grouper.

(f) Assessment of tag performance on reef fish species, primarily snappers and groupers. Characteristics examined should include shedding rate, effects on growth and survival, and ultimately, the effects of these characteristics on estimations of vital population parameters.

(g) Stock assessments to establish the status of major recreational and commercial species. Innovative methods are needed for stock assessments of aggregate species, including the effect of fishing on genetic structure and the incorporation of sex change for protogynous hermaphrodites into stock assessment models.

(h) Assessment of Florida Bay recovery actions on reef fish recruitment and survival.

3. *Management of reef fish.* (a) Research in direct support of management, including catch-and-release mortalities, by gear and depth.

(b) Evaluation of the use of marine reserves as an alternative or supplement to current fishery management practices and measures for reef fish. Studies should focus on the Experimental *Oculina* Reef Reserve, the Florida Keys National Marine Sanctuary, as well as on the identification of prime sites for the establishment of reserves in the U.S. south Atlantic and Gulf of Mexico.

(c) Characterization and evaluation of biological impacts (e.g., changes in age or size structure of reef fish populations in response to management strategies).

(d) Evaluation of vessel log data for monitoring the fishery and for providing biological and economic information for management; and methods for matching log data to Trip Information Program samples for indices of effort.

(e) For the U.S. Caribbean, collection of economic cost and returns data sufficient to evaluate management

proposals to limit the use of fish and/or lobster traps. (See Section V.C.1., regarding collection of information.)

(f) Determine the value and economic impact of recreational angling in the headboat fishery of the U.S. Caribbean. This will require the use of data to generate recreational demand equations for trips in general and for various key species. Economic impact assessment will require the collection of appropriate expenditure data and imputation using standard impact assessment software. (See Section V.C.1., regarding collection of information.)

C. *Red Snapper Research*

The Sustainable Fisheries Act of 1996 required the Secretary of Commerce to conduct a thorough and independent evaluation of the scientific and management basis for conserving and managing the red snapper fishery. NMFS has developed a research plan to improve the management of red snapper to address this requirement. The research priorities below are based on this research plan.

1. *Red snapper bycatch.* The bycatch of red snapper can have significant impacts from a fisheries management and ecological standpoint. Research on bycatch of red snapper should focus on the following:

(a) *Shrimp trawl bycatch of red snapper.* Specific guidance and research requirements are contained in the Cooperative Bycatch Plan for the Southeast, available from NMFS (see). Studies are needed to address:

(1) Identification, development, and evaluation of gear, non-gear, and tactical fishing options to reduce bycatch of red snapper.

(2) Development and evaluation of statistical methods to estimate the bycatch mortality of red snapper in the Gulf shrimp trawl fisheries.

(3) Studies of the survival rates of juvenile red snapper that escape shrimp trawls through bycatch reduction devices (BRDs).

(b) *Directed red snapper fisheries.* The reef fish fishery is exploited by a variety of fishing gear and tactics. The following research on regulatory discards is needed to better evaluate the effectiveness of management measures such as minimum size limits and closed seasons:

(1) Development and evaluation of gear and fishing tactics to minimize the bycatch of or increase the survival of discarded red snapper and other reef fish species.

(2) Characterization and assessment of the impact of bycatch of undersized reef fish species, including release mortality.

during recreational and commercial fishing. Research on the catch-and-release mortality of red snapper and other reef fish species, by gear (e.g., capture by commercial bandit rigs that are electrically or hydraulically powered), fishery (e.g., headboat, private boat, charter boat, commercial), and depth. Studies are needed to specifically relate "sink or swim" data, which can be obtained through observer programs, with long-term survival rates.

(3) Research to document predation rates on discarded red snapper and other reef fish species.

(c) *Economic considerations of bycatch reduction.* (1) Develop and test models, using actual or hypothesized data, that explicitly consider the costs and gains of bycatch reduction. The models should include the effects of the management systems for the directed and bycatch fisheries and should attempt to describe criteria for the correct level of bycatch reduction (e.g., marginal cost and value of reduction are equal). Studies should evaluate alternatives to bycatch reduction devices (BRDs).

(2) Develop economic incentives and other innovative alternatives to gear and season/area restrictions as ways to reduce bycatch. The proposal should attempt to contrast the relative costs, potential gains, and level of bycatch reduction associated with traditional methods and any innovative alternatives addressed by the proposal.

(3) Develop and apply methodology to evaluate the use of bycatch quotas for all fisheries but particularly with respect to red snapper bycatch in the shrimp fishery.

2. *Red snapper biological information.* Collection of basic biological data on red snapper.

(a) Contributions to the development of annual age-length keys and description of the age structure of red snapper populations.

(b) Design of sampling systems to provide a production-style aging program for the red snapper fishery. Effective dockside sampling programs are needed over a wide geographic range to collect information on reproductive state, size, age, and sex.

(c) Reproduction studies of red snapper.

(1) Maturity schedules, fecundity, and sex ratios of red snapper.

(2) Studies to characterize the actual reproductive contribution of females by age.

(d) Identification of sources of recruitment of red snapper in Gulf waters.

3. *Red snapper population assessment.* (a) Determination of the

habitat and limiting factors for important red snapper populations in the Gulf.

(b) Estimates of red snapper abundance, age structure and population dynamics on oil platforms and other artificial structures.

4. *Management of red snapper.* (a) Characterization and evaluation of biological impacts (e.g., changes in age or size structure of red snapper populations in response to management strategies).

(b) Research to evaluate the use of minimum size limits as a management tool in the red snapper fishery.

(c) Research to collect economics data on Texas anglers since Texas does not participate in the Marine Recreational Fisheries Statistics Survey (MRFSS). Data requirements include those identified in the MRFSS add-on economic survey developed by NMFS. (See Section V.C.1., regarding collection of information.)

(d) Research to develop bioeconomic models to optimize allocations and benefits derived from the red snapper resource.

D. Coastal Migratory Pelagic Fisheries

The commercial and recreational demand for migratory coastal pelagics has led to overfishing for certain species. Additionally, some are transboundary with Mexico and other countries and may ultimately demand international management attention. Current high priorities include:

1. Recruitment indices for king and Spanish mackerel, cobia, dolphin, wahoo, and bluefish, primarily from fishery-independent data sources.

2. Fishery-independent methods of assessing stock abundance of king and Spanish mackerel.

3. Release mortality data for all coastal pelagic species.

4. Improved catch statistics for all species in Mexican waters, with special emphasis on king mackerel, dolphin, and wahoo. This includes length-frequency and life history information.

5. Information on populations of coastal pelagics overwintering off the Gulf of Mexico and the South Atlantic States of North Carolina, South Carolina, Georgia, and Florida, especially concerning population size, age, and movement patterns. Calculate the mixing rates for Atlantic/Gulf king mackerel on an annual basis.

6. Development of a practical method for aging dolphin.

7. Basic biostatistics for cobia, dolphin, and wahoo to develop age-length keys and maturation schedules for stock assessments and to evaluate stock structures.

8. Impact of bag limits on total catch and landings of king and Spanish mackerel, dolphin, wahoo, and cobia.

9. Demand and/or supply functions for the commercial king mackerel fisheries, including baseline cost and return data. Cooperative efforts that cover the entire Southeast and employ common methodologies for all geographic areas are strongly encouraged.

E. Groundfish and Estuarine Fishes

Substantial stocks of groundfish and estuarine species occur in the Gulf and South Atlantic. Most of the database for assessments comes from studies conducted by NMFS and state fishery management agencies. Because of the historical and current size of these fish stocks, of their importance as predator and prey species, and of their current or potential use as commercial and recreational fisheries, more information on their biology and life history is needed. General research needs are:

1. *Red drum.* (a) Size and age structure of the offshore adult stock in the Gulf and South Atlantic.

(b) Life history parameters and stock structure for the Gulf and the South Atlantic: Migratory patterns, long-term changes in abundance, growth rates, and age structure. Specific research needs for Atlantic red drum are estimates of fecundity as a function of length and weight and improved coast-wide coverage for age-length keys.

(c) Catch-and-release mortality rates from inshore and nearshore waters.

(d) Estimates of absolute abundance of red drum in the Gulf of Mexico and the Atlantic.

2. Life history and stock structure for weakfish, menhaden, spot, croaker, flounder, sheepshead, black drum, mullet, and white trout in the Gulf and the South Atlantic. Migratory patterns, long-term changes in abundance, growth rates, and age structure and comparisons of the inshore and offshore components of recreational and commercial fisheries.

3. Improved catch-and-effort statistics from recreational and commercial fisheries, including development of age-length keys for size and age structure of the catch, to develop production models. (See Section V.C.1., regarding collection of information.)

4. Abundance and distribution information on spiny dogfish off the coast of North Carolina, and particularly southern North Carolina.

5. Restoration of access to historical habitat for diadromous fish. Study, design, and plan installation of up and downstream fish passage facilities or removal of migratory obstructions.

Construct fish passages and remove obstructions. Conduct post construction evaluation of effectiveness in restoring habitat access and fish stocks.

F. Essential Fish Habitat

1. Determine the effects of fishing gears (e.g., trawls and traps) and practices (e.g., gear retrieval and anchoring) on essential fish habitat (EFH), with emphasis on benthic habitats within the EEZ of the Caribbean, southern U.S. Atlantic, and Gulf of Mexico regions.

2. Develop scientific data to allow the identification and refinement, as appropriate, of EFH designations for the various life stages of Federally managed species.

3. Develop scientific data to allow the identification and refinement, as appropriate, of Habitat Areas of Particular Concern (HAPC) designation for the various life stages of Federally managed species.

4. Develop GIS mapping protocols and tools to allow the presentation of EFH, HAPC, fishery distribution information, and other relevant data for the southeastern United States, including Puerto Rico and the U.S. Virgin Islands.

G. General

Many other areas of research including methods for data collection, management, analysis, and better conservation, need to be addressed for improved understanding and management of fishery resources. Examples of such research needs include:

1. Identification and profiling of fishing communities, characterization of community dependence upon fishery resources and demographics of the families dependent on fishing or fishing related businesses in the Gulf of Mexico and U.S. Caribbean. Focus should be on identification of all types of fishery dependency including commercial harvest, recreational harvest, processing, support and supply, etc. The degree of dependence on specific sectors and species should be identified. (See Section V.C.1., regarding collection of information.)

2. Development of improved methods and procedures for transferring technology and educating constituency groups concerning fishery management and conservation programs. Of special importance are programs concerned with controlled access and introduction of conservation gear.

3. Design and evaluation of innovative approaches to fishery management with special attention given to those

approaches that control access to specific fisheries.

4. Examination of the feasibility and efficacy of license buy-back programs.

5. Social, cultural, and /or economic aspects of establishing fishery reserves. Studies should employ accepted data collection methods and should include consumptive users, non-consumptive users, and persons not dependent on use of marine resources. Various management alternatives should be considered in the studies, e.g., exclude all users, all consumptive users, size of reserve, anchoring rules, or any other relevant management tools. (See Section V.C.1., regarding collection of information.)

6. Design and evaluation of limited access options for the red snapper and king mackerel recreational fisheries with specific emphasis on modes of fishing and jurisdictional issues.

7. Estimation of demand models for recreational fishing trips when the target species include a single species, an aggregate of related species, or all species combined. Studies using new data from the Southeast economics add-on to Marine Recreational Fisheries Statistics Survey are highly encouraged. Priority species include red drum, Spanish mackerel, red grouper, wahoo, and dolphin.

8. Sociocultural survey of commercial fishing in the Florida Keys. Proposals should address all fishing enterprises including potential sociocultural effects of large marine reserves in the Tortugas area. (See Section V.C.1., regarding collection of information.)

9. Studies to evaluate the value of non-consumptive uses of marine resources, especially as related to diving activities and marine reserves.

10. Examination and comparison of the expected economic and social impacts of fisheries regulations with realized impact for all regulated species. Attempts should be made to identify and isolate behavioral causes of divergence as opposed to environmental causes. (See Section V.C.1., regarding collection of information.)

11. Examination of the motivational causes that determine fishing behavior, both commercial and recreational. For the commercial sector, including the operation side of the for-hire industry, specific attention should be given to whether profit maximization is an appropriate motivational assumption for fishing behavior. (See Section V.C.1., regarding collection of information.)

12. Determination of the recreational value and economic impact of the headboat fishery in the Southeast. This will require the use of collected data to generate recreational demand equations

for trips in general and for various key species. Economic impact assessment will require the collection of appropriate expenditure data and imputation using standard impact assessment software. (See Section V.C.1., regarding collection of information.)

13. Evaluation of the extent and impact of recreational sales (all species) on recreational harvests, commercial closures and demand for recreational fishing. (See Section V.C.1., regarding collection of information.)

14. Identification of options for the economic affects of effort control/limited access in the recreational fishery. (See Section V.C.1., regarding collection of information.)

15. Evaluation of the issue of fishing opportunity being transferred from commercial to recreational or conservation sectors under a transferable rights program. (See Section V.C.1., regarding collection of information.)

16. Evaluation of the recreational harvest of spiny lobster and queen conch in the U.S. Caribbean. (See Section V.C.1., regarding collection of information.)

III. How to Apply

A. Eligibility

To apply for grants or cooperative agreements, you must follow the instructions in this document. Eligible applicants include institutions of higher education, hospitals, other nonprofits, commercial organizations, and state, local and Indian tribal governments. Federal agencies or institutions are not eligible. Foreign governments, organizations under the jurisdiction of foreign governments, and international organizations are excluded for purposes of this solicitation since the objective of the MARFIN program is to optimize research and development benefits from U.S. marine fishery resources. (See A. Background.)

We are strongly committed to broadening the participation of Historically Black Colleges and Universities, Hispanic Serving Institutions, and Tribal Colleges and Universities in its educational and research programs. DOC/NOAA's goals are to achieve full participation by Minority Serving Institutions (MSI) in order to advance the development of human potential, to strengthen the nation's capacity to provide high-quality education, and to increase opportunities for MSIs to participate in and benefit from Federal financial assistance programs. DOC/NOAA encourages all

applicants to include meaningful participation of MSIs.

B. Duration and Terms of Funding

We will award grants or cooperative agreements for a maximum period of up to three years, consisting of one, two, or three budget periods. The award period depends upon the duration of funding requested in the application, the decision of the NMFS selecting official on the amount of funding, the results of post-selection negotiations between the applicant and NOAA officials, and pre-award review of the application by NOAA and Department of Commerce (DOC) officials. Normally, each project budget period is 12 months in duration.

C. Cost Sharing

Cost-sharing is not required for the MARFIN program. Applications must provide the total budget necessary to accomplish the project, including contributions and/or donations. Because 15 U.S.C. 713c-3(c)(4)(B) provides that the amount of Federal funding must be at least 50 percent of the estimated cost of the project, the total costs shown in the proposal will be evaluated for appropriateness according to the administrative rules, including 15 CFR Part 14.23 and 15 CFR Part 24.24, as appropriate. If an applicant chooses to cost-share, and if that application is selected for funding, the applicant is bound by the percentage of the cost share reflected in the grant or cooperative agreement award. *Note:* Costs incurred in either the development of a project or the financial assistance application, or time expended in any subsequent discussions or negotiations prior to the award, are neither reimbursable nor recognizable as part of the recipient's cost share.

D. Application Format and Requirements

The Department of Commerce Pre-Award Notification Requirements for Grants and Cooperative Agreements contained in the **Federal Register** notice of October 1, 2001 (66 FR 49917), are applicable to this solicitation. Your application must be complete and must follow the format described in the MARFIN Application Package. The standard forms in a MARFIN application include the MARFIN Project Budget and the MARFIN Project Summary. Applicants should contact the NMFS Southeast Regional Office for a copy of this solicitation's MARFIN Application Package (see **ADDRESSES**). You may also obtain the application package from the MARFIN Home Page

at: <http://caldera.sero.nmfs.gov/grants/programs/marfin.htm>.

Project applications must identify the principal participants, and include copies of any agreements describing the specific tasks to be performed by participants. Project applications should give a clear presentation of the proposed work, the methods for carrying out the project, its relevance to managing and enhancing the use of Gulf of Mexico and/or South Atlantic fishery resources, and cost estimates as they relate to specific aspects of the project. Budgets must include a detailed breakdown, by category of expenditures, with appropriate justification for both the Federal and non-Federal shares.

Applications should exhibit familiarity with related work that is completed or ongoing. Where appropriate, proposals should be multi-disciplinary. In addition to referencing specific area(s) of special interest, proposals should state whether the research applies to the Gulf of Mexico only, the South Atlantic only, or to both areas. Successful applicants may be required to collect and manage data in accordance with standardized procedures and formats approved by NMFS and to participate with NMFS in specific cooperative activities that are determined by consultations between NMFS and successful applicants before project grants are awarded. All applications must include funding for the principal investigator to participate in an annual MARFIN Conference in Tampa, FL at the completion of the project.

Applications must be one-sided and unbound. All incomplete applications are returned to the applicant. Ten copies (one original and nine copies) of each application are required and should be submitted to the NMFS Southeast Regional Office, State/Federal Liaison Office (see **ADDRESSES**). The Office of Management and Budget (OMB) has approved 10 copies, under OMB Control No. 0648-0175.

E. Indirect Costs

The total dollar amount of the indirect costs proposed in an application under this program must not exceed the indirect cost rate negotiated and approved by a cognizant Federal agency prior to the proposed effective date of the award or 25 percent of the Federal share of the total proposed direct costs dollar amount in the application, whichever is less. A copy of the current, approved, negotiated Indirect Cost Agreement with the Federal Government must be included with the application.

IV. Screening, Evaluation, and Selection Procedures

A. Initial Screening of Applications

When we receive applications we will screen them to ensure that they were received by the deadline date (see **DATES**); include SF 424 signed and dated by an authorized representative; were submitted by an eligible applicant; address one of the funding priorities for federally managed species; and include a budget, statement of work, and milestones, and identify the principal investigator. Before the deadline, you have the opportunity to correct any deficiencies in your application. After the deadline, the application must remain as submitted; no changes can be made to it. If your application does not conform to these requirements and the deadline for submission has passed, the application is returned without further consideration.

We do not have to screen applications before the submission deadline, nor do we have to give you an opportunity to correct any deficiencies that cause your application to be rejected.

B. Evaluation of Proposed Projects

1. *Technical evaluation.* Applications responsive to this solicitation will be evaluated by three or more appropriate private and public sector experts to determine their technical merit. These reviewers will provide individual evaluations of the proposals. No consensus advice will be given. These reviewers provide comments and assign scores to the applications based on the following criteria, with the weights shown in parentheses:

a. Does the proposal have a clearly stated goal(s) with associated objectives that meet the needs outlined in the project narrative? (30 points maximum)

b. Does the proposal clearly identify and describe, in the project outline and statement of work, scientific methodologies and analytical procedures that will adequately address project goals and objectives? (30 points maximum)

c. Do the principal investigators provide a realistic timetable to enable full accomplishment of all aspects of the research? (20 points maximum)

d. How effective are the proposed methods in enabling the principal investigators to maintain stewardship of the project performance, finances, cooperative relationships, and reporting requirements? (10 points maximum)

e. Does the budget appropriately allocate and justify costs? (10 points maximum)

2. *Scientific Panel.* Applications together with the technical reviewers'

comments and scores are presented to a Scientific Panel composed of NMFS scientific experts. This panel provides comments and rates each proposal as either "Recommended for Funding" or "Not Recommended for Funding" based on merits of the science, the necessity of the information that would be gained by the project, and the likelihood of assisting industry or fisheries management.

3. *MARFIN Panel.* Proposals that are "Recommended for Funding" by the Scientific Panel are presented to a panel of non-NOAA fishery experts known as the MARFIN Panel. Each member of the MARFIN Panel individually considers if needs of the Agency are addressed in each proposal, if the project assists industry, and if the project addresses issues that are important to regional fisheries management. The individuals on the MARFIN Panel provide comments and rate each of these proposals as either "Recommended for Funding" or "Not Recommended for Funding." No consensus advice will be given by the panel. The Program Manager ranks the proposals in the order of preferred funding, based on the number of MARFIN Panel members recommending the proposal for funding.

4. *Regional Administrator.* The proposals reviewed by the MARFIN Panel are ranked by the Program Manager in the order of preferred funding, based on the number of MARFIN Panel members recommending the proposal for funding, then provided to the Regional Administrator, who is the selecting official. The Regional Administrator also receives the MARFIN Panel members' individual comments, and comments from the Scientific Panel for projects it rated as "Recommended for Funding."

The Regional Administrator, in consultation with the Assistant Administrator for Fisheries, determines the projects to be funded. Though rarely used, the Regional Administrator has an option to make a selection that falls outside the MARFIN Panel's order of preferred funding on the following grounds: for geographic diversity, if not enough projects have addressed a priority, or because of duplication with other funded grants within NOAA. The Regional Administrator will justify in writing any such selection.

The exact amount of funds awarded, the final scope of activities, the project duration, and specific NMFS cooperative involvement with the activities of each project are determined in pre-award negotiations between the applicant, the NOAA Grants Office and the NMFS Program Office. Projects must not be initiated by recipients until a

signed award is received from the NOAA Grants Office. Successful applications generally are recommended within 210 days from the date of publication of this notice. The earliest start date of awards average 90 days after each project is selected and after all NMFS/applicant negotiations of cooperative activities have been completed. The earliest start date of awards is about 300 days after the date of publication of this notice. Applicants should consider this selection and processing time in developing requested start dates for their applications.

V. Administrative Requirements

A. Your Obligations as an Applicant

You must:

1. Meet all application requirements and provide all information necessary for the evaluation of the proposal, including one signed original and nine signed copies of the application.
2. Be available to respond to questions during the review and evaluation of the proposal(s).

B. Your Obligations as a Successful Applicant (Recipient)

If you are selected to receive a grant award for a project, you must:

1. Manage the day-to-day operations of the project, be responsible for the performance of all activities for which funds are granted, and be responsible for the satisfaction of all administrative and managerial conditions imposed by the award.
2. Keep records sufficient to document any costs incurred under the award, and allow access to these records for audit and examination by the Secretary of Commerce, the Comptroller General of the United States, or their authorized representatives; and, submit financial status reports (SF 269) to NOAA Grants in accordance with the award conditions.
3. Submit semiannual project status reports on the use of funds and progress of the project to us within 30 days after the end of each 6-month period. You will submit these reports to the individual identified as the NMFS Program Officer in the funding agreement.
4. Submit a final report within 90 days after completion of each project to the NMFS Program Officer. The final report must describe the project and include an evaluation of the work you performed and the results and benefits in sufficient detail to enable us to assess the success of the completed project.
5. In addition to the final report, we request that you submit any publications printed with grant funds

(such as manuals, surveys, etc.) To the NMFS Program Officer for dissemination to the public.

We are committed to using available technology to achieve the timely and wide distribution of final reports to those who would benefit from this information. Therefore, you are required to submit final reports in electronic format, in accordance with the award terms and conditions, for publication on the NMFS MARFIN Home Page. You may charge the costs associated with preparing and transmitting your final reports in electronic format to the grant award.

We will provide you with OMB-approved formats for the semiannual and final reports.

C. Other Requirements of Recipients

If a grant is made that specifically requires the collection of information from the public, the grantee is responsible for preparing the documentation necessary to obtain Paperwork Reduction Act (PRA) approval prior to the start of the collection. This approval process takes a minimum of 4 months. This provision especially applies to priorities A.6.(c), B.3.(e), B.3.(f), C.4.(c), E.3., G.1., G.5., G.8., G.10., G.11., G.12., G.13., G.14., G.15., and G.16. Information on the PRA process can be found at the following Web site address: www.rdc.noaa.gov@pra.

Applications under this program are subject to the provisions of Executive Order 12372, "Intergovernmental Review of Federal Programs."

Prior notice and an opportunity for public comments are not required by the Administrative Procedure Act or any other law for this notice concerning grants, benefits, and contracts. Therefore, a regulatory flexibility analysis is not required for purposes of the Regulatory Flexibility Act.

This action has been determined to be not significant for purposes of Executive Order 12866.

Notwithstanding any other provision of law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the Paperwork Reduction Act, unless that collection displays a currently valid OMB control number.

This notice contains collection-of-information requirements subject to the Paperwork Reduction Act. The use of Standard Forms 424, SF-LLL, and SF-424B have been approved by OMB under the respective control numbers 0348-0043, 0348-0046 and 0348-0040. The other application requirements and the semi-annual and final reports have

been approved by OMB under control number 0648-0175. Public reporting burden for the latter collections of information is estimated to average 4 hours for an application, 1 hour for a semi-annual report, and 1 hour for a final report. These estimates include the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding these burden estimates or any other aspect of these collections of information, including suggestions for reducing this burden, to Ellie Francisco Roche (see ADDRESSES).

Authority: 15 U.S.C. 713c-3(d).

Dated: October 5, 2001.

William T. Hogarth,

*Assistant Administrator for Fisheries,
National Marine Fisheries Service.*

[FR Doc. 01-25902 Filed 10-12-01; 8:45 am]

BILLING CODE 3510-22-S

Appendix 5

MARFIN
Project
Summaries

MARFIN PROJECT SUMMARY

Project Title: Enhancing Industry Contribution Towards Documentation of Fishing Effort and Bycatch Reduction in the Shrimp Fishery of the Southeastern United States

Project Status/Duration: New X Con't **Project Period:** 12 Months

Name, Address, and Telephone Number of Applicant:

Gulf & South Atlantic Fisheries Foundation, Inc.
Lincoln Center, Suite 997
5401 West Kennedy Blvd
Tampa, FL 33609
Phone: (813) 286-8390 FAX: (813) 286-8261

Principal Investigator(s) and Brief Statement of Qualifications:

Ms. Judy L. Jamison - Over 21 years administrative and grants management experience
Dr. Tomas Vergel C. Jamir - Over 17 years fisheries/oceanographic research and project management experience

Project Objectives:

- (a) Solicit and pre-screen as many industry, NMFS, State or internationally developed BRDs that show potential for use in the Gulf of Mexico and South Atlantic shrimp fishery;
- (b) Conduct operational tests on approximately ten (10) promising BRDs following the official NMFS (Gulf of Mexico and South Atlantic Fishery Management Council) BRD Certification Testing Protocol;
- (c) Collect field data on BRD certification tests using Foundation contracted (NMFS certified) fishery observers;
- (d) Analyze and disseminate the results of tests to the commercial fishery industry, federal and state fishery management agencies, and Sea Grant/Marine Extension Service;
- (e) Collect shrimp fishing effort, catch and corresponding rates of red snapper bycatch among commercial shrimp trawlers in the Gulf of Mexico; and
- (f) Determine the red snapper bycatch and estimated fishing mortality (F) reduction potential of various experimental BRDs.

Specific Priority(ies) in Solicitation to Which Project Responds:

- 1. **Bycatch** (a) Shrimp trawl fisheries (1) Data collection and analyses to expand and update current bycatch estimates. (3) Identification, development and evaluation of gear fishing options to reduce bycatch.
- 2. **Red Snapper Research** (a) Red Snapper Bycatch (1) Shrimp trawl bycatch of red snapper.

Summary of Works (For continuing projects, include progress to date)

The project will field test ten (10) promising industry bycatch reduction devices (BRDs) for certification following NMFS BRD Certification Testing Protocol for the South Atlantic and Gulf of Mexico. Included in the work plan are solicitation and review (with the Gear Review Panel) of industry ideas and prototype BRD designs for subsequent: (a) underwater hydrodynamic performance tests with NMFS-Pascagoula, (b) prototype BRD gear construction and tuning, and (c) actual field certification testing aboard commercial shrimp trawls fishing within the U.S. Federal waters (i.e., Exclusive Economic Zone).

Data collection will be handled by Foundation contracted Fishery Observers, including data editing and entry by a contracted Data Manager into the NMFS-Galveston Bycatch Database. The Foundation's Program Director (Gear Technologist) will conduct the necessary statistical analysis for BRDs that met the "good tow" requirements, report write-up and presentation of results. Overall program administration will be handled by the Foundation's Executive Director. Bycatch reduction estimates will follow the procedures outlined in the protocol (modified paired t-test) including future revisions (e.g., proposed ratio analysis).

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$553,095			\$553,095
Non-Federal				
Total	\$553,095			\$553,095

MARFIN PROJECT SUMMARY

Project Title: Genetic Impacts of Shrimp Trawling on Gulf Red Snapper

Project Status/Duration: New: X Cont': Period: 12 Months

Name, Address, and Telephone Number of Applicant:

Texas A&M Research Foundation
P.O. Box 3578
College Station, Texas 77843
Phone: (409) 845-8629

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. John Gold (voice: 979-847-8778; e-mail: goldfish@tamu.edu) - >25 years experience in fish molecular genetics with emphasis on population structure and use of molecular genetics in attaining management goals; experience on a variety of species, including red drum, spotted seatrout, king mackerel, greater amberjack, red grouper, bluefin tuna, and red snapper.

Project Objectives: Primary objectives are as follows: (i) provide scientific information critical to management of red snapper resources in the Gulf of Mexico; (ii) assess potential genetic impacts on red snapper that stem from accidental mortality caused by shrimp trawling and which may reduce effective size of red snapper subpopulations thereby negatively impacting recruitment and long-term adaptive resilience; and (iii) determine whether red snapper assemblages from five subregions (localities) across the northern Gulf are increasing or decreasing in genetic effective population size. In addition to providing a fishery - independent estimate of abundance of breeding adults, the last also provides a novel, genetics-based measure of stock or subpopulation structure.

Specific Priority(ies) in Solicitation to Which Project Responds:

Priority 1 - Bycatch: a.(2) status of fish stocks significantly impacted by shrimp trawler bycatch;
Priority 2 - Reef Fish: a.(3) recruitment of reef fish a.(4) stock structure of reef fish
Priority 3 - Red snapper: a.(1) shrimp trawl bycatch a.(2) directed red snapper fisheries

Summary of Work to be performed: (For continuing projects, include progress to date)

Work to be performed will include the following: (i) assay of allelic variation at 20 nuclear-encoded microsatellites from samples (75-100 age 0 fish) taken during shrimp trawling and representing five subregions (localities) in the northern Gulf, (ii) determination of whether juveniles taken as bycatch represent random samples of genotypes within each subregional assemblage - multiple tests, including regression analysis of unbiased coefficients of genetic relatedness, will be employed to assess whether shrimp trawling could negatively impact red snapper genetic effective size; and (iii) determination of whether red-snapper assemblages in the five subregional localities are increasing or decreasing in effective population size. The last will involve tests of the mutation-genetic drift equilibrium and will provide a genetics-based assessment of status and condition of subregional assemblages of red snapper in the northern Gulf. It also will address in a novel way the issue of subpopulation or stock structure of red snapper in the Gulf of Mexico.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 68,825			\$ 68,825
Non-Federal	\$ 13,312			\$ 13,312
Total	\$ 82,137			\$ 82,137

NA17FF2031

MARFIN PROJECT SUMMARY

Project Title: Behavior and Swimming Performance of Red Snapper, *Lutjanus campechanus*: Its Application to Bycatch Reduction

Project Status/Duration: New X Cont Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:

Glenn R. Parsons
Department of Biology
The University of Mississippi
Box 1848
University, MS 38677-1848
Phone: (662) 915-7479

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Glenn R. Parsons, Professor of Biology, 20 years experience in fish biology, Gulf of Mexico fishes, extensive research in fish swimming, published many papers on fish behavior and performance.

Project Objective: To assess the swimming ability and behavior of red snapper and apply this information to shrimp trawl bycatch reduction.

Specific Priority(ies) in Solicitation to which Project Responds: 1. Bycatch: Identification, development and evaluation of gear, non-gear and tactical fishing options to reduce bycatch.

Summary of Work: (For continuing projects, include progress to date)

In this proposal, we will investigate behavior and swimming in juvenile red snapper. Specifically, we will consider the effects of size, season, and time of day on red snapper behavior and swimming. In addition, we will evaluate a vortex generating BRD to assess its ability to reduce capture of juvenile snapper during shrimp trawl operations. This information may provide information essential to reducing red snapper bycatch and mortality.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 70,447	\$ 70,650	\$ 71,900	\$212,997
Non-Federal	\$ 57,960	\$ 59,468	\$ 59,653	\$177,081
Total	\$128,407	\$130,118	\$131,553	\$390,078

NA17FF2867

MARFIN PROJECT SUMMARY

Project Title: Technology Transfer of New Turtle Excluder Device Modifications and Updated Bycatch Reduction Device Information to the Southeastern Shrimp Industry

Project Status/Duration: New X Cont Project Period: 12 Months

Name, Address, and Telephone Number of Applicant:

Gulf & South Atlantic Fisheries Foundation, Inc.

5401 W. Kennedy Blvd., Suite 997

Tampa, FL 33609

Phone: (813) 286-8390

Principal Investigator(s) and Brief Statement of Qualifications:

Ms. Judy L. Jamison, Executive Director; 22 years grants administration experience

Mr. Geoffrey C. Lane, Program Director; 9 years in marine research/education

Project Objective: (a) Provide the shrimping industry with clear description of new TED regulations; (b) Provide information and assistance with newly mandated TED modifications; (c) Provide information of new BRD designs, status of prototype gears being tested, and assist individuals with problems they are encountering; and (d) Share experiences of fishermen with BRDs and TEDs in one are (both positive and negative) with industry members.

Specific Priority(ies) in Solicitation to which Project Responds:

(A) Bycatch (1) Shrimp Trawl Fisheries (d) Improved methods for communicating with and improving technology and information transfer to the shrimping industry; and (c) Red Snapper Research (a) Shrimp Trawl Bycatch of Red Snapper (1) Identification of gear to reduce bycatch of red snapper.

Summary of Work: (For continuing projects, include progress to date) This proposal involves the networking of gear specialists throughout the Southeast. Gear experts from the NMFS Harvesting Branch will collaborate with the Foundation/Sea Grant specialists to disseminate information on mandated TED changes and new BRD information. Meetings and workshops will be conducted from North Carolina to Texas. Comprehensive educational thrusts will be directed toward TED/BRD technology transfer through formal and informal workshops as well as individual, one-on-one assistance.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$171,000			\$171,000
Non-Federal				
Total	\$171,000			\$171,000

MARFIN PROJECT SUMMARY

Project Title: Evaluation of the Efficacy of Current Minimum Size Regulations for Selected Reef Fish Based on Release Mortality and Fish Physiology

Project Status/Duration: New: X Cont': _____ Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Karen M. Burns
Program Manager, Fisheries Biology Program
Mote Marine Laboratory
1600 Ken Thompson Parkway
Sarasota, FL 34236
Phone: (941) 388-4441 FAX: (941) 388-4441
e-mail: Kburns@mote.org

Principal Investigator(s) and Brief Statement of Qualifications:

Karen M. Burns is the Principal Investigator of 8 (eight) successfully completed and 1 (one) recently awarded MARFIN project: as well as the Principal Investigator of MML's Reef Fish and Coastal Pelagic Tagging Program. She supervised a Master's thesis on red snapper survival in 1997.

Robin Overstreet has worked before with Karen Burns, on a MARFIN Cobia Stock Assessment Study in the Gulf of Mexico and in the South Atlantic, Award No. NA57FF0294. He directs the "Parasitology Department" at USM's College of Marine Sciences, which includes three graduate students, several technicians, and others. His program deals with red snapper and is part of a cooperative program with MML (NA006FL0501), as well as a USDA funded U.S. Marine Shrimp Farming Program (98-38808-6019).

Project Objectives

- ▶ To test the hypothesis that red grouper are more susceptible to depth-induced mortality than red snapper based not only on swimbladder size and thickness, but also on the amount of bundles of rete mirabile and gas gland cells in the swimbladder.
- ▶ To test the hypothesis that smaller red grouper (<12 in. [30.5 cm]) survive rapid decompression better than larger (>15 in. [38 cm]) red grouper because of changes in swimbladder structures with size (between 12 - 15 in. [30.5 - 38 cm]).
- ▶ To obtain catch and release mortality rates relative to depth and gear for red grouper, gag, red snapper, vermilion snapper and mangrove snapper.
- ▶ To obtain movement and migration patterns for red grouper, gag, red snapper, and mangrove snapper in the Gulf of Mexico and South Atlantic.

Specific Priority(ies) in Solicitation to Which Project Responds:

1. Bycatch
 - c. Reef Fish fisheries
2. Reef Fish
 - b. Population assessment of Reef Fish
 - (2) Source and quantification of natural and human-induced mortalities. Including release mortality estimates, etc.
 - (6) Assessment of tag performance on Reef Fish species, primarily snappers and groupers, etc.
3. Red Snapper Research
 - a. Red snapper bycatch.
 - b. Red snapper population
 - (2) Estimates of red snapper abundance, age structure and population dynamics. etc. artificial structures.

Summary of Work: (For continuing projects, include progress to date)

1. Collect red snapper and red grouper swimbladders over available size range especially 12 in. (30.5cm) - 15 in. (38cm) for histological analyses of the development of secretory structure.
2. Tag red grouper and red snapper especially 12 in. (30.5cm) - 15 in. (38cm) to evaluate survival from depth with development of swimbladder secretory structures.
3. Tag red grouper, red snapper, gag, mangrove, and vermilion snapper to obtain release mortality by depth and to obtain growth, movement and migration data.
4. Double tag target species for tag shedding rates.
5. Evaluate circle hook captured red snapper survival by depth.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$167,481	\$192,323		\$359,804
Non-Federal	\$ 66,211	\$ 67,641		\$133,852
Total	\$233,692	\$259,964		\$493,656

MARFIN PROJECT SUMMARY

Project Title: Estimating Discard Rate and Release Mortality of Red Snapper in Texas Fisheries

Project Status/Duration: New: X Con't: Period: 36 Months

Name, Address, and Telephone Number of Applicant:

Sandra Diamond
Department of Biology
Texas Tech University
Lubbock, TX 79409
Phone: (806) 742-1999
e-mail: Sandra.Diamond@ttu.edu

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Sandra Diamond has conducted research on bycatch issues, primarily in shrimp trawl and gill net fisheries, for over 15 years. In the mid-1980s, she ran the onboard observer program and participated as an observer in the pelagic drift net fishery in California. She is currently a member of the RFSAP and the SSC for the Gulf Council.

Dr. Quenton Dokken, co-PI, has over 20 years experience in the study and research of marine fish ecology and fisheries in Texas. Currently his work is focused on the ecosystem dynamics of natural and artificial reefs in the northwestern Gulf of Mexico and the socioeconomics of Texas fisheries. He has been the lead in working with offshore oil/gas producers to allow scientists to conduct marine research on platforms.

Project Objective: 1) To estimate delayed release mortality of red snapper under controlled conditions. 2) To find physiological indicators, of delayed release mortality using blood samples from caught fish. 3) To estimate discard rate and delayed release mortality in commercial and recreational fisheries using the indicators from the controlled study. 4) To tag released fish to estimate recapture rate by the fisheries. 5) To relate discard rate to year class strength using SEAMAP data.

Specific Priority(ies) in Solicitation to Which Project Responds:

1. a.(2), 1. c.(2), 1. c. (3), 2. b. (2), 2. c. (1), 3. a. (2) (b), and 3. d. (2) relate to estimating discard rate and discard mortality of red snapper relating observer estimates of release mortality to long-term survival, and evaluating the use of size limits as a management tool for red snapper.

Summary of Work: (For continuing projects, include progress to date)

Red snapper, the most economically important reef fish in the Gulf of Mexico, has been classified as overfished since 1984. Since then managers have regulated the directed fisheries using size and bag limits, closed seasons, and trip and seasonal quotas. The use of these measures assumes that either fishermen can avoid catching illegal fish or that catch-and-release does not contribute significantly to fishing mortality, but these assumptions may not be valid. We propose to conduct a study of release mortality under controlled field conditions to estimate the delayed release mortality with different capture depths and water temperatures using red snapper caught with hook and line and suspended from oil platforms, and to investigate the use of physiological indicators of stress (plasma cortisol, lactate, and osmolality) to estimate delayed release mortality. We will also spend two years riding aboard commercial and recreational fishing boats to obtain better estimates of discard rates, to use the physiological indicators to estimate delayed release

mortality in the field, and to conduct a tagging study to look at recapture rates over the season and between years. We will also look for a predictor of discard rate by relating discard rate in the fisheries to year class strength. If we can relate physiological measurements taken soon after capture to immediate and delayed release mortality, then we will be able to obtain much better estimates of release mortality to use in the stock assessment. Even if physiological indicators cannot be correlated with delayed release mortality, this study will provide data on discard rates and release mortality from the fisheries that can be used by the Gulf Council and NMFS to improve the red snapper stock assessment and help design management strategies to more effectively rebuild the overfished red snapper stock. If successful, these indicators may also be useful for other reef fish, such as red grouper.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$151,412	\$ 99,027	\$103,805	\$354,244
Non-Federal				
Total	\$151,412	\$ 99,027	\$103,805	\$354,244

MARFIN PROJECT SUMMARY

Project Title: Ecological Factors Limiting Density and Regulating Growth and Condition for Gag Groupers:
A Definitive Test for the Role of Shelter.

Project Status/Duration: New X Cont ____ **Project Period:** 24 Months

Name, Address, and Telephone Number of Applicant:

University of Florida
IFAS, G040 McCarty Hall
P.O.Box 110110
Gainesville, FL 32611
Phone: (352) 392-2356

Principal Investigator(s) and Brief Statement of Qualifications:

William J. Lindberg, Ph.D. and 19 years of fisheries related research
Thomas K. Frazer, Ph.D. and 10 years of fisheries related research
Kenneth M. Portier, Ph.D. and 18 years of statistical consulting

Project Objective: The goal for this project is to determine if reef habitat, specifically available shelter, limits local densities of gag grouper, *Mycteroperca microlepis*, and thereby regulates the growth and condition of gag on the shallow continental shelf, i.e., that gag growth and condition are density-dependent as a consequence of shelter limitation.

Specific Priority(ies) in Solicitation to which Project Responds:

Reef Fish: (A.1.a.) Age and Growth, (A.4.a.) Movement, and (B.3.) Habitat and Limiting Factors

Summary of Work: (For continuing projects, include progress to date)

The FY 1999 MARFIN announcement (*Federal Register* Vol.63, No.208, p.57660) emphasizes that "The ecology of reef fish makes them vulnerable to overfishing, because they tend to concentrate over specific types of habitat with patchy distribution. This behavior pattern can make traditional fishery statistics misleading." Therefore, scientific knowledge of how reef fish use patchy habitat and the effects on demographic parameters is essential for modeling their population and community dynamics, and for effectively planning and evaluating proposed actions to rebuild or maintain reef fishery stocks (e.g., changes in size limits or marine reserves). This project will experimentally test whether or not the growth and condition of gag, *Mycteroperca microlepis*, is density-dependent as a consequence of shelter limitation on gag densities through the process of density-dependent habitat selection. Such work is essential for spatially explicit population models to serve the effective management of reef fishes such as gag grouper.

Reef shelter will be manipulated in a field experiment of 2 years duration. Intensive non-destructive sampling of experimental reefs will provide time-series data for predicted changes in fish densities and relative weight, while periodic sub-sampling will provide specimens for growth estimates from otolith analyses. This approach is possible only because replicate experimental reefs already exist, with a foundation of data already established.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$90,000	\$85,158		\$175,158
Non-Federal	\$76,523	\$78,670		\$155,193
Total	\$166,523	\$163,828		\$330,351

NA17FF2870

MARFIN PROJECT SUMMARY

Project Title: Validation of Ages for Species of the Deepwater Snapper/Grouper Complex Off the Coast of the Southeastern United States

Project Status/Duration: New X Cont Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Patrick J. Harris
Marine Resources Research Institute
PO Box 12559
Charleston, SC 29422-2559
Phone: (843) 406-4034

Principal Investigator(s) and Brief Statement of Qualifications:

Patrick J. Harris, Ph.D.; Associate Marine Scientist, SCDNR; experience with life history studies and project management

Project Objective: The primary goal of the proposed research is to validate increment counts from otolith sections of tilefish (*Lopholatilus chamaeleonticeps*), snowy grouper (*Epinephelus niveatus*), blackbelly rosefish (*Helicolenus dactylopterus*), blueline tilefish (*Caulotilus microps*) and wreckfish (*Polyprion americanus*) off the southeastern United States using accelerator mass spectrometry analysis of delta ¹⁴C present in otoliths.

Specific Priority(ies) in Solicitation to which Project Responds: B. Reef Fish 1. Collection of basic biological data for species in commercially and recreationally important fisheries. (A) Age and growth of Reef fish. (2) Contributions to the development of annual age-length keys and description of age structures for exploited populations for all species in the complex addressed in the Reef fish and Snapper/Grouper Management Plans for the South Atlantic.

Summary of Work: (For continuing projects, include progress to date) Age and growth studies have been performed for a number of deepwater species in the snapper/grouper complex of the South Atlantic Bight. However, increments on these otoliths are typically extremely difficult to interpret, and most studies are published without any validation of the periodicity of increment formation. Validation of increment counts as an estimate of age is critical if any age-structured management is used for a species. Marginal increment analyses were performed for snowy grouper and blackbelly rosefish; however, the sample sizes used for each were rather low (248 for snowy grouper and 294 for blackbelly rosefish). No validation was attempted for the remaining three species. Radiocarbon has been utilized as a tool to validate the ages of long-lived species that were hatched during 1950-1970, when the activity of ¹⁴C in the world's oceans doubled due to atmospheric testing of nuclear weapons. We will analyze thirty otolith sections each of tilefish (*Lopholatilus chamaeleonticeps*), snowy grouper (*Epinephelus niveatus*), blackbelly rosefish (*Helicolenus dactylopterus*), blueline tilefish (*Caulotilus microps*) and wreckfish (*Polyprion americanus*) obtained from an archive of otoliths maintained by MARMAP to validate ages obtained by counting increments from the same otoliths. By validating ages based on increment counts, this study will allow for species in this complex (many of which are over fished) to be managed using current age-structured models.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 27,848	\$ 41,615		\$ 69,463
Non-Federal				
Total	\$ 27,848	\$ 41,615		\$ 69,463

MARFIN PROJECT SUMMARY

Project Title: Red Snapper *Lutjanus campechanus* in the Northern Gulf of Mexico: Age and Size Composition of the Commercial Harvest and Mortality of Regulatory Discards

Project Status/Duration: New X Con't **Project Period:** 36 Months

Name, Address, and Telephone Number of Applicant:

Office of Sponsored Programs
330 Thomas Boyd Hall
Louisiana State University
Baton Rouge, LA 70803-2701
Voice: (225) 578-3386

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Charles A. Wilson and Mr. David L. Nieland, 21 years and 15 years experience, respectively, in age, growth, and reproductive biology of marine fishes in the northern Gulf of Mexico.

Project Objectives: For the red snapper commercial harvests in the northern GOM during 2001-2004: 1) determine the distribution of ages and lengths within these catches, 2) compare age and length distributions among harvest years and to previous studies, and 3) investigate both the catch-and release mortality and the age composition of regulatory discards.

Specific Priority(ies) in Solicitation to Which Project Responds: 2. a. (1) (a)-age and growth of RS; 2. a. (1) (b)-annual age-length keys for RS; 2. a. (1) (c)-production ageing of RS; 2. c. (3)-evaluation of impacts of management strategies; 3. a. (2) (b)-release mortality of RS in the commercial fishery; 3. b. (1)-annual age-length keys for RS; 3. b. (2)-production ageing of RS; 3. d. (1)-evaluation of impacts of management strategies.

Summary of Work: (For continuing projects, include progress to date)

Lengths and ages of red snapper randomly selected from the commercial fishery in the northern Gulf of Mexico will be used to describe the size and age composition of the harvest. Observers placed on commercial vessels will qualitatively assess release mortality of red snapper regulatory discards in the commercial fishery and collect undersized specimens for an examination of the age structure of same. All data will be furnished to the National Marine Fisheries Service for their use in periodic stock assessment efforts.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 88,050	\$101,583	\$108,383	\$298,016
Non-Federal	\$ 32,487	\$ 34,769	\$ 36,630	\$103,886
Total	\$120,537	\$136,352	\$145,013	\$401,902

MARFIN PROJECT SUMMARY

Project Title: The Use of Lipofuscin for Aging Caribbean Spiny Lobster (*Panulirus argus*)

Project Status/Duration: New X Cont Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Thomas R. Mathews
South Florida Regional Laboratory
Florida Marine Research Institute
2796 Overseas Highway
Marathon, FL 33050

Principal Investigator(s) and Brief Statement of Qualifications:

1. Thomas Matthews. The collection of specimens and rearing of known-age lobster will be coordinated by Matthews. Matthews has 12 years experience studying the ecology and management of the Caribbean spiny lobster.
2. Charles Derby. The quantification of lipofuscin in the eyestalks of *P. argus* will be performed in Derby's laboratory. Derby has 24 years experience studying the neurobiology and behavior of lobsters, and the last 20 years on the Caribbean spiny lobster *P. argus*.
3. Matt Sheehy is recognized as the world's expert on using the lipofuscin technique for aging crustaceans and has extensive experience in applying the results to fisheries management of commercially important Crustaceans in Europe and Australia.

Project Objective: There are two objectives to this project. The first is to make accurate determinations of the ages of lobster from the Florida Keys and Dry Tortugas to develop a complete growth curve and age-length key to understand the general growth parameters for use in fisheries management. Second, lobsters of known age (reared in the laboratory) will be used to calibrate the age-length key.

Specific Priority(ies) in Solicitation to which Project Responds: MARFIN identified the need to describe age and growth patterns for many fishery species including reef fish (B)(1a). Reef fish (1a) Age and growth. (2) Development of age-length keys), migratory fish (D(7) Develop age-length keys), ground/estuarine fishes (E(multiple references)). The need for information on the age and growth of the Caribbean spiny lobster is also critical as the resource approaches overexploitation or is already over exploited throughout its range (Cochrane and Chakalall 2001). This species is one of the most valuable commercial species in Florida and also supports a large recreational fishery.

Summary of Work: (For continuing projects, include progress to date) The goal of this proposal is to derive the age-structure of the Caribbean spiny lobster, *Panulirus argus*, population in the Florida Keys and in the Dry Tortugas fisheries. Understanding the age structure of this fishery species is critical. The identification of age-cohorts and the development of age-length key(s) will allow the determination growth rates, calculation of fishing mortality on specific year classes, development of recruitment indices, and allow the use of more powerful age-structured population analysis models to aid the successfully management of the spiny lobster fishery. Quantification of lipofuscin, from histological examination of tissue, has proven to be the best predictor of age of many animals (Katz et al., 1984; Eldred and Lasky, 1993), including crustaceans. The regression of lipofuscin concentration vs. age is highly significant, unlike size vs. age. This has been demonstrated in European lobsters *Homarus gammarus*, suggesting that the lipofuscin content in the terminal medulla of the eyestalks can be quantified and used to estimate age of Caribbean spiny lobsters.

The first part of our proposal entails quantifying the lipofuscin content from a length-stratified sample of 240 lobster from the Florida Keys fishery and 300 lobsters from the Dry Tortugas fishery. From a length-stratified sample we can determine age cohorts using model analysis of a lipofuscin content frequency histogram and develop age-length keys. Second, we will calibrate the lipofuscin-model analysis using the lipofuscin content from lobster of known age, raised under laboratory conditions that duplicate natural conditions as closely as possible. Quantification of lipofuscin from known-age lobster will also allow development of generalized growth parameters for lobsters from the fishery.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 57,339	\$ 57,942		\$115,281
Non-Federal	\$ 48,385	\$ 44,274		\$ 92,659
Total	\$105,724	\$102,216		\$207,940

MARFIN PROJECT SUMMARY

Project Title: Stock Structure of Red Snapper in the Northern Gulf of Mexico: Is Their Management as a Single Unit Justified Based on Spatial and Temporal Patterns in Otolith Microchemistry?

Project Status/Duration: New _____ Cont X **Project Period:** 36 Months

Name, Address, and Telephone Number of Applicant:

University of South Alabama
Department of Marine Sciences
LSCB Room 25
Mobile, AL 36688-0002
Phone: (334) 460-7136

Principal Investigator(s) and Brief Statement of Qualifications:

Principal Investigator: Dr. James H. Cowan, Jr. - 15 years experience in fish life history studies including otolith microchemistry

Co-Principal Investigators:

Dr. John Gold - 25 years experience in genetics research with emphasis on stock identification

Dr. Charles A. Wilson - 20 years experience with research on age, growth, and reproductive biology of numerous fish species

Project Objective: We have joined forces in this interdisciplinary, interstate effort to combine scientific expertise in molecular biology (Gold), otolith microchemistry (Cowan) and red snapper life history (Wilson) to address critical questions regarding red snapper biology. The central goal of the project is to provide scientific information critical to the management and conservation of the red snapper resource in the Gulf of Mexico. The primary objective to which all three lines of investigation are focused is a rigorous assessment/determination of the population (stock) structure of Gulf red snapper.

Specific Priority(ies) in Solicitation to which Project Responds:

Priority 1 - Bycatch: a.(2) concerning status and condition of fish stocks significantly impacted by shrimp trawl bycatch, with emphasis on red snapper. Priority 2 - Reef Fish: a.(1)(a) Collection of basic biological data: a.(1)c. provide production-style aging program. A.(2)(a) and (b) reproductive studies: a.(4)(a) stock structure, b.(7) development of innovative methods of stock assessment: c.(3) characterization and evaluation of biological impacts.

Summary of Work: (For continuing projects, include progress to date)

For red snapper in the northern Gulf, we will determine: (i) population (stock) structure across the northern Gulf; (ii) relative contribution(s) of regional nursery areas to offshore reef assemblages; (iii) long-term movement and mixing rates across the northern Gulf; (iv) the (genetic) effective population size (N_e) of sub-regional groups; (v) patterns of genetic variation/diversity and (genetic) effective population size over decadal time scales to determine if stock size in the Gulf has decreased significantly over the last two-three decades; (vi) if bycatch in shrimp trawls off the Texas and Louisiana coasts represent a random sample from the subregion; (vii) nursery origin of juveniles taken as bycatch; (viii) growth rates of samples from different subregions in the northern Gulf; and , (ix) reproductive biology.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 58,617	\$ 63,146	\$ 65,593	\$187,356
Non-Federal	\$ 23,135	\$ 13,945	\$ 15,292	\$ 52,372
Total	\$ 81,752	\$ 77,091	\$ 80,885	\$239,728

MARFIN PROJECT SUMMARY

Project Title: Stock Structure of Red Snapper in the Northern Gulf of Mexico: Is Their Management as a Single Unit Justified Based on Spatial and Temporal Patterns of Genetic Variation, Otolith Microchemistry, and Growth Rates?

Project Status/Duration: New _____ Cont X **Project Period:** 36 Months

Name, Address, and Telephone Number of Applicant:

Texas A&M Research Foundation
P. O. Box 3578
College Station, Texas 77843
Phone: (409) 845-8629

Principal Investigator(s) and Brief Statement of Qualifications:

Principal Investigator: Dr. John Gold (voice: 409-847-8778; e-mail: goldfish@tamu.edu) - 25 years experience in fish molecular genetics with emphasis on population structure

Co-Principal Investigators:

Dr. Charles A. Wilson - 20 years experience with research on age, growth, and reproductive biology of numerous fish species; and Dr. James H. Cowan, Jr. - 15 years experience in fish life history studies including otolith microchemistry

Project Objective: We have joined forces in this interdisciplinary, interstate effort to combine our scientific expertise in molecular biology (Gold), otolith microchemistry (Cowan) and red snapper life history (Wilson) to address critical questions regarding red snapper biology. The central goal of the project is to provide scientific information critical to the management and conservation of the red snapper resource in the Gulf of Mexico. The primary objective to which all three lines of investigation are focused is a rigorous assessment/determination of the population (stock) structure of Gulf red snapper.

Specific Priority(ies) in Solicitation to which Project Responds:

Priority 1 - Bycatch: a.(2) status of fish stocks significantly impacted by shrimp trawl bycatch. Priority 2 - Reef Fish: a.(1)(a) basic biological data: a.(1)c. production-style aging program. a.(2)(a) and (b) reproductive studies: a.(4)(a) stock structure, b.(7) development of innovative methods of stock assessment: c.(3) characterization and evaluation of biological impacts.

Summary of Work: (For continuing projects, include progress to date)

For red snapper in the northern Gulf, we will determine: (i) population (stock) structure across the northern Gulf; (ii) relative contribution(s) of regional nursery areas to offshore reef assemblages; (iii) long-term movement and mixing rates across the northern Gulf; (iv) the (genetic) effective population size (N_e) of sub-regional groups; (v) patterns of genetic variation/diversity and (genetic) effective population size over decadal time to determine if stock size in the Gulf has decreased significantly over the last two-three decades; (vi) if bycatch in shrimp trawls off the Texas and Louisiana coasts represent a random sample from the subregion; (vii) nursery origin of juveniles taken as bycatch; (viii) growth rates of samples from different subregions in the northern Gulf; and, (ix) reproductive biology.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$122,159	\$138,476	\$143,899	\$404,534
Non-Federal	\$ 28,441	\$ 29,461	\$ 30,383	\$ 88,285
Total	\$150,600	\$167,937	\$174,282	\$492,819

MARFIN PROJECT SUMMARY

Project Title: Stock Structure of Red Porgy, *Pagrus pagrus*, in the North Atlantic

Project Status/Duration: New X Con't **Project Period:** 36 Months

Name, Address, and Telephone Number of Applicant:

Amy O. Ball
Marine Resources Research Institute
SC Department of Natural Resources
P.O. Box 12559
Charleston, SC 29422-2559
Phone: (843) 762-5106, FAX: (843) 762-5110
e-mail: ball@mrd.dnr.state.sc.us

Principal Investigator(s) and Brief Statement of Qualifications:

Amy O. Ball, Ph.D.; Biologist III, SCDNR; extensive research experience with genetic stock identification and project management

George R. Sedberry, Ph.D.; Senior Marine Scientist, SCDNR; extensive fisheries and stock identification research; experience with project management

Robert W. Chapman, Ph.D.; extensive molecular and population genetics experience; experience with project management

Project Objective: To determine stock identification in red porgy by examining variation in mtDNA and nuclear microsatellites. To define fishery management units based on genetic stock structure, life history characteristics, and jurisdiction. To determine the effects of fishing on the population, biology, and management of red porgy in the South Atlantic Bight and Gulf of Mexico.

Specific Priority(ies) in Solicitation to Which Project Responds:

Federal Register 66(36):11151. 2.a.(3) and 2.a.(4). 2.Reef fish. a. Collection of basic biological data for species in commercially and recreationally important fisheries. (3)Recruitment of Reef fish. (4)Stock structure of reef fishes.

Summary of Work: (For continuing projects, include progress to date)

The red porgy, *Pagrus pagrus*, is a protogynous sparid that is of commercial and recreational importance throughout its range. The species is found in the North and South Atlantic Oceans; however, it is unknown if there are separate stocks within the range. Off the southeastern United States (South Atlantic Bight, SAB), sustained heavy fishing pressure over two decades has resulted in a severely overfished population that has a smaller size at age, maturation (females), and sexual transition in the 1990's than during the late 1970's. This has resulted in closures of the fishery in the southeast Atlantic; however, the Gulf of Mexico fishery has not been subjected to such drastic measures and the stock appears to be in better condition in the Gulf. In the eastern Atlantic, red porgy populations have recently experienced a resurgence, with increased abundance and larger size. A year class of very large fish occurred in 1998 and this presumed year class had not been previously observed in the fishery. We propose to use molecular techniques to determine if there are distinct stocks of red porgy in the Gulf of Mexico and SAB, and to determine the relationship of these stocks to the eastern North Atlantic and South Atlantic Ocean.

	Year 1	Year 2	Year3	Total
Project Funding:				
Federal	\$ 83,544	\$100,216	\$ 96,332	\$280,092
Non-Federal	\$ 16,006	\$ 16,006	\$ 16,006	\$ 48,018
Total	\$ 99,550	\$116,222	\$112,338	\$328,110

NA17FF2875

MARFIN PROJECT SUMMARY

Project Title: Stable Isotopes as Tracers of Patterns in Habitat Utilization by Juvenile Red Snapper

Project Status/Duration: New X Cont **Project Period:** 12 Months

Name, Address, and Telephone Number of Applicant:

James H. Cowan, Jr.
Coastal Fisheries Institute
Louisiana State University
Baton Rouge, LA 70803-7503
Phone: (225) 578-9400

Principal Investigator(s) and Brief Statement of Qualifications:

James H. Cowan, Jr.: Has 15 years of experience conducting research on fish life history, trophic dynamics and bioenergetics.

Richard F. Shaw: Has 25 years of experience conducting research on recruitment issues concerning the early life stages of fishes.

Project Objective: The primary objective of this one-year study is to determine if juvenile red snapper tissues differ in isotopic composition at endpoints in their purported patterns of habitat utilization, i.e., between settlement from the plankton and later recruitment to reefs, due to associated dietary shifts in response to changes in habitat-specific food web structure.

Specific Priority(ies) in Solicitation to which Project Responds:

This work responds directly to priorities II.B.2(c), II.C.3(a) and II.C.3(b) in Federal Register Vol. 66, No. 199, October 15, 2001, pages 52390-52393.

Summary of Work: (For continuing projects, include progress to date) We propose to use stable isotopic composition of red snapper tissues as chemical tracers of food web dynamics and dietary shifts. We infer that if different habitats on which juvenile red snapper are found provide differences in feeding opportunities, these differences should be detectable in their tissues. In this preliminary one-year study, we propose to collect juvenile red snapper from three primary habitats: open sand bottom, low-relief shell rubble reefs, and artificial reefs. We will determine if the stable isotopic composition of same-sized (age-0 or age-1) juvenile red snapper, as well as their gut contents, differ among these habitats, thus indicating habitat-specific dietary shifts in response to differences in food web structure.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 44,823			\$ 44,823
Non-Federal	\$ 32,103			\$ 32,103
Total	\$ 76,926			\$ 76,926

MARFIN PROJECT SUMMARY

Project Title: Demographics, Density, and Seasonal Movement Patterns of Reef Fish in the Northeastern Gulf of Mexico
Associated with Marine Reserves

Project Status/Duration: New X Cont Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Florida State University
Office of Research
118 North Woodward Avenue
Tallahassee, FL 32306-4166
Phone: (850) 644-5260

Principal Investigator(s) and Brief Statement of Qualifications:

F. Coleman and C. Koenig have extensive knowledge of population ecology of reef fishes of the Gulf of Mexico. They were instrumental in having the marine protected areas in the northeastern Gulf of Mexico set aside as experimental areas for studying the potential of MPAs to be used as fisheries management tools. Their work on the biology and ecology of reef fishes has long served as the basis for important management decisions in both the Gulf of Mexico and the South Atlantic.

Project Objective:

To locate historical fishing sites within & outside the northeastern Gulf of Mexico fishery reserves with the aid of commercial fishers.

To determine the age structure, movement patterns & rates, & sex ratios of all economically important species sampled from study sites using conventional dart & internal anchor tags & non-injurious biopsy methods.

To determine movement patterns & seasonal habitat associations of selected economically important species sampled from study sites using ultrasonic tags.

To census fish populations with ROV on the selected sites within & outside the fishery reserves to determine density (mark-resight methods), size structure (laser systems), & sex ratio of sexually dimorphic species.

To compare the demographic, census, & movement patterns of economically important reef fish between years to evaluate interannual variation.

To evaluate the significance of the seasonal winter closure of the grouper fishery.

Specific Priority(ies) in Solicitation to which Project Responds:

3. Reef fish fisheries (B) Reef Fish: age & growth (1a1), (1a2); reproduction (1b1), (1b3), (1b4), (1b5); recruitment (1c1), (1c2); Stock structure (1d1), (1d3). Population assessment (2a), (2e), (2f) Management (3a), (3b), (3c). Red Snapper (c): Biological information (2a), reproduction (2c1), (2c2), recruitment sources (2d), population assessment (3a), (3b). EFH (F2), (F3).

Summary of Work: (For continuing projects, include progress to date) The overall goal of the proposed research is to characterize the density, movement patterns, and demographic patterns for all fishery species (including gag, scamp, red grouper, red snapper, vermilion snapper, and amberjack) associated with the Madison-Swanson and Steamboat Lumps Fishery Reserves on the eastern Gulf of Mexico shelf edge. These characteristics and patterns will be studied within the reserves as well as in reference sites outside of the reserve over a two year period, thus allowing comparisons both spatially and temporally of fishing effects on these characteristics. We will also evaluate the effects of the seasonal grouper fishery closure on the demographics, movement patterns, and associations among reef fish species.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$196,000	\$177,531		\$373,531
Non-Federal				
Total	\$196,000	\$177,531		\$373,531

MARFIN PROJECT SUMMARY

Project Title: Partitioning Release Mortality in the Undersized Red Snapper Bycatch: Comparison of Depth vs. Hooking

Project Status/Duration: New X Cont **Project Period:** 24 Months

Name, Address, and Telephone Number of Applicant:

Karen M. Burns
Program Manager
Fisheries Biology Mote Marine Laboratory
1600 Ken Thompson Parkway
Sarasota, FL 34236
Telephone: (941) 388-4441; Fax: (941) 388-4242; e-mail: kburns@mote.org

Principal Investigator(s) and Brief Statement of Qualifications:

Karen M. Burns is the Principal Investigator of 8 (eight) successfully completed and 1 (one) recently awarded MARFIN project, as well as the Principal Investigator of MML's Reef Fish and Coastal Pelagic Tagging Program. She supervised a Master's thesis on red snapper survival in 1997.

Raymond R. Wilson, Jr., Ph.D., Associate Professor, Dept. of Bio Sciences, California State U., Long Beach. Principal Investigator on 3 (three) reef fish studies on survivorship of undersized red groupers. funded by S-K/MARFIN and NURP at Wilmington. Supervisor of 2 (two) Master's thesis on red groupers.

Project Objective: To provide data on red snapper discard mortality by depth and gear.

Specific Priority(ies) in Solicitation to which Project Responds:

(C) Management of reef fish.

1. Research in direct support of management, including catch and release mortalities

(B) 2. Source and quantification of natural and human-induced mortalities, including release mortality estimates for charter boats, headboats, and private rec vessels esp. for red snapper and the grouper complex.

(A) 4. Stock structure of reef fish

a. Movement and migration patterns of commercially and recreationally valuable reef fish species.

Summary of Work: (For continuing projects, include progress to date)

- I. Use hyperbaric chambers to simulate field conditions in the lab to investigate the effect of rapid pressure changes on red snapper physiology.
- II. Tag red snapper caught aboard charter boats, headboats and rec vessels using circle hooks and compare results with red snapper returns from J hook captured fish.
- II. Compare acute mortality of red snapper caught by J vs. circle hooks.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$60,000	\$56,871		\$116,871
Non-Federal	\$38,154	\$32,423		\$70,577
Total	\$98,154	\$89,294		\$187,448

NA17FF2878

MARFIN PROJECT SUMMARY

Project Title: Can Marine Protected Areas Conserve Genetic Diversity in Tomtate, Haemulon Aurolineatum, and French Grunt, H. Flavolineatum?

Project Status/Duration: New X Cont **Project Period:** 36 Months

Name, Address, and Telephone Number of Applicant:

SC Department of Natural Resources
217 Ft. Johnson Road
Charleston, SC 29422-2559
Phone: (843) 762-5000

Principal Investigator(s) and Brief Statement of Qualifications:

R. W. Chapman, extensive experience in genetic analysis of reef species
G. R. Sedberry, extensive experience in reef fish biology and ecology
B. Luckhurst, extensive experience in reef fish biology and management

Project Objective:

1. Assess levels of genetic variation within and among populations of tomtate and French grunt in the western Atlantic using mitochondrial and nuclear DNA loci.
2. Determine levels of genetic exchange among populations using standard population genetics tools.
3. Evaluate the degree of population isolation in light of the requirements of current ecological models evaluating the impact of MPAs.

Specific Priority(ies) in Solicitation to which Project Responds: B. Reef fish 3b. Evaluation of the use of marine reserves as an alternative or supplement to current fishery management practices and measures for reef fish.

Summary of Work: (For continuing projects, include progress to date) In this proposal we outline a program of research aimed at examining the level of genetic differentiation among populations of tomtate and French grunt in the southeastern US, the Gulf of Mexico, Trinidad, the Caribbean and Bermuda. The effective number of migrants per generation will be estimated based upon molecular data as a means of evaluation dispersal and thus potential benefits of MPAs, with respect to these species and the ecosystems in which they reside. The effort is not aimed at a complete survey of these species throughout their range. Rather we propose to assess the levels of genetic exchange among these areas and relate these findings to current model predictions on the benefits of MPAs. We have selected tomtate and French grunt because they are abundant members of hard bottom communities along the southeastern US, substantial research has shown their ecological importance to these systems, and they are related to white grunt (H. Plumieri) and, thus, may demonstrate a similar pattern differentiation.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 93,000	\$103,242	\$ 85,647	\$281,889
Non-Federal	\$ 16,120	\$ 16,120	\$ 16,120	\$ 48,360
Total	\$109,120	\$119,362	\$101,767	\$330,249

NA17FF2879

MARFIN PROJECT SUMMARY

Project Title: An Economic Analysis of Fleet Dynamics in the Gulf of Mexico Grouper Fishery

Project Status/Duration: New X Cont Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Board of Supervisors
Louisiana State University & Agricultural and Mechanical College
Office of Sponsored Programs
330 Thomas Boyd Hall
Baton Rouge, LA 70803-2701
Phone: (225) 578-3386

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Walter R. Keithly, Jr., Associate Professor, School of the Coast & Environment
Dr. Richard Kazmierczak, Jr., Associate Professor, Department of Agricultural Economics

Project Objective: The overall goal of this project is to provide a better understanding of grouper fishermen behavior under varying economic and regulatory conditions. To this end, objectives include: (1) analysis of those factors influencing gear choice, (2) development and estimation of a defensible economic model that explains observed behavior of Gulf of Mexico grouper vessels, and (3) analysis of the impacts of alternative management policies on grouper harvests and production technology.

Specific Priority(ies) in Solicitation to which Project Responds:

B.3.(a) Management of reef fish (research in direct support if management)

Summary of Work: (For continuing projects, include progress to date) National Marine Fisheries Reef Fish Log Book data, augmented with appropriate costs data, will be used to develop and estimate a defensible economic model depicting behavior of Gulf of Mexico grouper fishermen. The economic models will be derived using microeconomic and econometric conditions. Results from this exercise will be used to forecast the impacts associated with specific proposed management options.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$102,975	\$106,005		\$208,980
Non-Federal	\$ 35,420	\$ 35,638		\$ 71,058
Total	\$138,395	\$141,643		\$280,038

MARFIN PROJECT SUMMARY

Project Title: Investigating Movement Patterns and Spawning Habitat of Red Hind Grouper in a Newly Established Marine Fishery Reserve in the US Virgin Islands.

Project Status/Duration: New XX Cont **Project Period:** 24 Months

Name, Address, and Telephone Number of Applicant:

Richard S. Nemeth
Eastern Caribbean Center University of the Virgin Islands
St. Thomas, US Virgin Islands 00802
Phone: (340) 693-1389

Principal Investigator(s) and Brief Statement of Qualifications:

Richard S. Nemeth, Ph.D. - Strong background in fisheries science (BS, MS) and reef fish ecology (Ph.D.) Entire Ph.D. utilized diving research (NAUI dive master, 1500+ hours). Experience in fish tagging (sonic, Floy, coded wire, elastomer injection). P.I. has spent past 7 yrs conducting Caribbean reef fish population surveys and fish recruitment studies.

Project Objective: (1) Evaluate effectiveness of Red Hind Bank Marine Fishery Reserve by documenting location and size of grouper spawning aggregations & reef fish community structure.
(2) Investigate the source of groupers spawning in Red Hind Bank using tag/recapture and sonic tracking programs and produce an area utilization map of adults in USVI region.

Specific Priority(ies) in Solicitation to which Project Responds: Areas of special interest in REEF FISH section: C2 - Evaluation of Marine Reserves as fisheries management tool; A4a - Movement and migration patterns of commercially important fish, B6 - assess tag performance on groupers.

Summary of Work: (For continuing projects, include progress to date) The Red Hind Bank will soon be established as the first Marine Fishery Reserve in the US Virgin Islands. It is unique in that the site includes the only known red hind grouper spawning aggregation site. Establishment of a MFR offers the unique opportunity to assess and evaluate the effectiveness of MFR's as a management action by documenting the response of reef fish populations released from 20+ years of heavy fishing pressure. We propose to visually survey reef fish population structure & density of red hind grouper spawning aggregations over a two year period. An intensive tag/release/recapture program and sonic tracking of aggregating groupers will provide some of the first information on the source of groupers spawning at that site. Target tagging #15 will be 2500 fish tagged with external Floy tags and 10 sonic tagged and tracked individuals. We will assess tag performance over 1.5 years to enhance future estimate of vital population parameters. We will also produce area utilization maps for red hinds based on a synthesis of 2 year tag recovery program and sonic tracking data. These baseline data will provide fishery managers essential information on MFR's. These data will also complement NMFS' side-scan-sonar survey of the VI and PR shelf.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 90,000	\$51,423		\$141,423
Non-Federal	\$ 26,689	\$21,886		\$ 48,575
Total	\$116,689	\$73,309		\$189,998

MARFIN PROJECT SUMMARY

Project Title: Marine Reserve Effectiveness in Restoring Coastal Food Webs: An Experimental Test using the Special Protection Areas and an Ecological Reserve in the Florida Keys National Marine Sanctuary

Project Status/Duration: New: X Con't: Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Dauphin Island Sea Lab/Marine Environmental Sciences Consortium
101 Bienville Boulevard
Dauphin Island, AL 36528
Phone: (251) 861-2141

Principal Investigator(s) and Brief Statement of Qualifications:

John F. Valentine - Current investigations focus on the role of biotic processes in controlling the flow of energy among trophic levels in marine habitats, particularly herbivory on seagrasses; the application of conservation techniques for the protection of nearshore marine ecosystems; the use of marine protected areas to test the impacts of higher order consumers on the strength of trophic linkages between seagrass and coral reef habitats.

Project Objective: To inform scientists, managers and conservationists about the importance of linkages among habitats and landscape-scale considerations in the design of tropical marine reserves.

Specific Priority(ies) in Solicitation to Which Project Responds:

Section 8.c.2. Evaluation of the use of marine reserves as an alternative or supplement to current fishery management practices and measures for reef fish.

Summary of Work: (For continuing projects, include progress to date)

Scientists and conservationists alike are increasingly concerned that the harvesting of large predatory fishes has caused significant alterations in the structure and function of marine ecosystems. Marine reserves are being used as a tool to address this problem, but there has been little examination of (i) how fishing has altered food webs on reefs and adjacent habitats or (ii) how landscape-scale considerations should be included in the design of reserves. In addition, most reserves are small, unreplicated, designed around just one habitat type (usually a coral reef), and studies of marine reserves overlook the connectivity between coral reef and adjacent seagrass habitats, as well as the importance of reef structural complexity and geometry on the re-establishment of large predators. We propose to take advantage of the rare opportunity to use replicated "no-take" (predator rich) and unprotected (predator poor) reefs in the Florida Keys National Marine Sanctuary to assess the impact of large piscivorous fishes on food web structure in and around the coral reefs, the importance of linkages among seagrass and coral reefs in the re-establishment of these food webs, and the effects of habitat structure (complexity and fragmentation of reefs) on the success of marine reserves.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 86,644	\$ 96,934		\$183,578
Non-Federal	\$ 41,214	\$ 43,388		\$ 84,602
Total	\$127,858	\$140,322		\$268,180

NA17FF2881

MARFIN PROJECT SUMMARY

Project Title: Geographic Comparison of Age, Growth, Reproduction, Movement and Survival of Red Snapper Off the State of Florida

Project Status/Duration: New X Cont **Project Period:** 36 Months

Name, Address, and Telephone Number of Applicant:

Karen M. Burns
Program Manager Fisheries Biology Program
Mote Marine Laboratory
1600 Ken Thompson Parkway
Sarasota, FL 34236
Phone: (941) 388-4441

Principal Investigator(s) and Brief Statement of Qualifications:

Karen M. Burns is the Principal Investigator of nine (9) successfully completed, one (1) on-going and one (1) recently awarded MARFIN projects.

Nancy Brown-Peterson has worked with both Karen Burns and Robin Overstreet on the reproductive biology portion of a MARFIN Cobia Stock Assessment Study in the Gulf of Mexico and South Atlantic (award No. NA57FF0294). She has 20 years experience with histology and reproductive biology and has supervised and helped teach undergraduate and graduate students histological techniques and slide interpretation.

Robin Overstreet, Ph.D. has worked before with Karen Burns, on a MARFIN Cobia Stock Assessment Study in the Gulf of Mexico and in the South Atlantic, Award No. NA57FF0294. He directs the "Parasitology Department" at USM's College of Marine Sciences, which includes three graduate students, several technicians, and others. His program deals with red snapper and is part of a cooperative program with MML (NA006FL0501), as well as a USDA funded U.S. Marine Shrimp Farming Program (98-38808-6019).

Project Objective:

- ▶ To test the hypothesis that red snapper will survive depth induced mortality
- ▶ To obtain life history information including age and growth and reproductive data for red snapper off the southwest and northeast coast of Florida and compare these data with those from the northern Gulf of Mexico
- ▶ To test the hypothesis that circle hooks will greatly reduce release mortality in red snapper
- ▶ To obtain catch and release mortality rates relative to depth and gear for red snapper
- ▶ To determine tag shedding rates and effects on growth and survival for fish tagged with single barbed dart tags in red snapper
- ▶ To obtain movement and migration patterns for red snapper in the Gulf of Mexico and South Atlantic
- ▶ To monitor the movement patterns of wild red snapper as compared to those obtained by Gulf of Mexico Marine Stock Enhancement Program (GMSEP) for cultured red snapper stocked off Southwest Florida

Specific Priority(ies) in Solicitation to which Project Responds:

A. Bycatch

3. Reef fish fisheries. (b) Characterization and assessment of the impact of bycatch of undersized target species, including release mortality, during ...etc. (c) Determination of the release mortality by depth of red snapper caught on commercial bandit rigs that are...etc.

B. Reef Fish

1. Collection of basic biological data for species in commercially and recreationally important fisheries. (a) Age and growth of reef fish.

(1) Description of age and growth patterns, especially for red ...etc. (d) Stock structure of reef fish. (1) Movement and migration patters of commercially and recreationally valuable reef fish species...etc.

2. Population assessment of Reef fish. (b) Source and quantification of natural and human-induced mortalities, including release mortality estimates for charter boats, ...etc. (f) Assessment of tag performance on Reef fish species, primarily snappers and groupers. Characteristics examined should ...etc.

C. Red Snapper Research

1. Red snapper bycatch. The bycatch of red snapper can have significant impacts from a fisheries management and ecological ...etc. (b) Directed red snapper fisheries. (1) Development and evaluation of gear and fishing tactics to minimize the bycatch ...etc. (2) Characterization and assessment of the impact of bycatch of undersized reef fish species ...etc.

2. Red snapper biological information. (d) Identification of sources of recruitment of red snapper in Gulf waters.

4. Management of red snapper (a) Characterization and evaluation of biological impacts...etc. (b) Research to evaluate the use of minimum size limitsetc.

Summary of Work: (For continuing projects, include progress to date)

1. Collect red snapper otoliths and gonads over available size range for age/growth and reproductive studies.
2. Tag red snapper from the northeast and southwest coast of Florida and the northern Gulf of Mexico to evaluate survival from depth by gear type.
3. Tag red grouper, red snapper, gag, mangrove, and vermilion snapper to obtain release mortality by depth and to obtain release mortality by depth and to obtain release mortality by depth and to obtain growth, movement and migration data.
4. Double tag red snapper for tag shedding rates.
5. Evaluate circle hook captured red snapper survival by depth and gear type.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$197,633	\$206,143	\$219,385	\$623,161
Non-Federal	\$ 64,629	\$ 67,636	\$ 69,787	\$202,052
Total	\$262,262	\$273,779	\$289,172	\$825,213

NA17FF2872

MARFIN PROJECT SUMMARY

Project Title: Assessment of Bathymetric Highs as Nursery Habitat of Newly Settled Red Snapper

Project Status/Duration: New X Cont Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Texas A&M Research Foundation
3578 TAMU
College Station, TX 77843
Phone: (979) 845-3806

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Jay Rooker, Assistant Professor, Expertise and Research Interests: Fisheries Ecology, Post-recruitment processes, Analytical approaches to fish demography

Dr. Andre Landry, Professor, Expertise and Research Interests: Sea Turtle and Fisheries Ecology

Dr. Tim Dellapenna, Assistant Professor, Expertise and Research Interests: Marine Geology, Active acoustics

Project Objective: The proposed study will characterize bathymetric highs on the inner continental shelf in the NW Gulf of Mexico and evaluate the importance of these complex habitats as nursery grounds of red snapper.

Specific Priority(ies) in Solicitation to which Project Responds: The proposed responds to several MARFIN funding priorities listed in the Federal Register under Section 3 on red snapper research: 1) identification of sources of red snapper recruits in Gulf waters, 2) improve the understanding of factors affecting recruitment success, 3) identification of tactical fishing options to reduce bycatch of red snapper, and 4) determination of the habitat and limiting factors for important red snapper populations in the Gulf.

Summary of Work: (For continuing projects, include progress to date) This proposed research builds on a previously funded Marine Fisheries Initiative project. One year of support (MARFIN grant NA97FF0346) was obtained to determine spatial and temporal patterns of habitat use on a well-developed ridge system off Freeport, Texas. Results from the first year demonstrated that ridge and interface habitats represent important nursery areas for red snapper. The proposed research represents the next logical step in evaluating the importance of bathymetric highs as nursery habitat of red snapper. Several complementary approaches will be used to characterize environmental and habitat variables at several bathymetric highs in the NW Gulf of Mexico. The primary aim of the new work is to 1) expand the scope of the previous study and assess the importance of other bathymetric highs to early life history of red snapper in the NW Gulf, 2) couple active acoustic surveys with trawling data to provide fine-scale resolution of habitat utilization by new recruits, 3) combine estimates of growth and abundance to predict the recruitment potential of recruits from different bathymetric highs as well as different habitat types (ridge, interface, mud) within a system. Findings from the proposed work will be used to delineate essential nursery habitat of red snapper and assess the utility of habitat-based management strategies such as time and area closures. Moreover, bathymetric highs are currently being targeted as sources of sand for beach replenishment projects and thus results may aid in the protection and conservation of putative nurseries of red snapper that are in jeopardy of being compromised or lost entirely.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$105,324	\$106,145		\$211,469
Non-Federal	\$ 25,273	\$ 25,408		\$ 50,681
Total	\$130,597	\$131,553		\$262,150

NA17FF2880

MARFIN PROJECT SUMMARY

Project Title: Development of Assays for Major Histocompatibility Complex (MHC) Class I and Class II Loci in Gulf Red Snapper for Use in Stock Structure Analysis and Assessment of Genetic Health

Project Status/Duration: New X Cont Project Period: 12 Months

Name, Address, and Telephone Number of Applicant:

Texas Agricultural Experiment Station
2147 TAMU
College Station, TX 77843-2147
Phone: (979) 845-4761

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. John R. Gold (Voice: 979-847-8778; e-mail: goldfish@tamu.edu); >25 years experience in fish molecular genetics and development of genetic markers

Project Objective: The short-term objective of the project is to develop polymerase chain reaction (PCR) primers that optimize identification (discrimination) of orthologous from paralogous major histocompatibility complex (MHC) genes (loci) in Gulf red snapper. The long-term objective is to use the genetic tools developed in studies of stock structure and immune response capability of individuals/stocks to resist parasites, pathogens, and other cytotoxic challenge. The ultimate goal of the research is to provide information critical to the wise and effective management and conservation of red snapper resources in U.S. waters. Genetic markers to be developed also will be vital to stock enhancement of red snapper resources, should this become a necessity in the future.

Specific Priority(ies) in Solicitation to which Project Responds: C. Red Snapper Research. The specific priority to which proposed activities respond is 'Red Snapper Research' (although other priorities, including 'Bycatch' and 'Reef Fish' would be impacted). Specific sub-priorities include (i) red snapper biological information, (ii) red snapper population assessment, and (iii) stock structure of reef fish.

Summary of Work: (For continuing projects, include progress to date) (i) Clone and sequence fragments of red snapper major histocompatibility complex (MHC) class I and class II loci generated by PCR amplification. (ii) Approximate whether fragments (alleles) represent orthologous or paralogous MHC loci through phylogenetic analysis of coding (exon) regions. (iii) Design and Test specific PCR primer sets that amplify alleles at identified MHC loci of red snapper. (iv) Test Mendelian segregation in F₁ individuals to determine whether individual MHC alleles represent orthologous or paralogous loci. (v) Prepare semi-annual and annual reports for NMFS and the MARFIN Program Board.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 34,350			\$ 34,350
Non-Federal	\$ 7,690			\$ 7,690
Total	\$ 42,040			\$ 42,040

NA17FF2865

MARFIN PROJECT SUMMARY

Project Title: Linking Spatial-Temporal Population Size Structures and Fishing Effort Dynamics to Assess the Effectiveness of Minimum Size for Red Snapper Management

Project Status/Duration: New X Cont **Project Period:** 24 Months

Name, Address, and Telephone Number of Applicant:

University of Miami
Rosenstiel School of Marine and Atmospheric Science
4600 Rickenbacker Causeway
Miami, FL 33149
Phone: (305) 361-4741

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Nelson Ehrhardt. Population dynamics and stock assessment modeling, fishery management science and quantitative methods applied to fishery analysis. MSc. In Fisheries and Ph.D. in Marine Population Dynamics and Economics

Dr. David Die. Research Associate Professor. Fishery management and fish stock assessment. Extensive and current experience in red snapper assessments and red snapper ecology

Project Objective: 1) Develop a size structured spatial yield-per-recruit model to assess minimum size options for red snapper. 2) Compile temporal-spatial databases of red snapper population size structures and fishing effort. 3) Risk assessment research on effectiveness of minimum size implementation as an effective management tool for recuperating the Gulf of Mexico red snapper fishery.

Specific Priority(ies) in Solicitation to which Project Responds: C. Red snapper research. 4. Management of red snapper, (b) Research to evaluate the use of minimum size limits as management tool in the red snapper fishery AND (a) Characterization and evaluation of biological impacts (e.g., changes in age or size structure of red snapper populations in response to management strategies).

Summary of Work: (For continuing projects, include progress to date) We propose to fully develop a state-of-art size-structures yield-per-recruit model to use it in an assessment of the effectiveness of minimum size as a viable red snapper management option. Risk assessments will be performed with the new model by using probability distributions regarding the uncertainty of key components of the framework. The spatial population size distribution and abundance will be expressed as transitional probabilities in a stochastic migratory model while effort allocation will follow contagious fish population abundance conditions according to spatial distributions of the stock. The effects of age distributions at minimum size will be integrated as probability distribution as well, hence, portraying the most likely impact of minimum size and the associated spatial catch release survivorship on the size and age structure of the stock. The risk platform will be stated as the probability that the designed minimum size will not achieve the desired outcome under the fishery management strategy. The effects of such risks will also be evaluated regarding reference point estimation used in red snapper stock assessments.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 83,434	\$ 87,709		\$171,143
Non-Federal	\$ 17,354	\$ 18,243		\$ 35,597
Total	\$100,788	\$105,952		\$206,740

MARFIN PROJECT SUMMARY

Project Title: Bioeconomic Analysis of the Red Snapper Rebuilding Plan and Transferable Rights Policies in the Gulf of Mexico

Project Status/Duration: New X Cont **Project Period:** 24 Months

Name, Address, and Telephone Number of Applicant:

Wade L. Griffin
Department of Agricultural Economics
Texas A&M University
College Station, TX 77843-2124
Phone: (979) 845-4291

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Wade L. Griffin possesses a wealth of experience relative to this project. Griffin has completed twenty-five projects related to the Gulf of Mexico some of which include real effort measurement, Texas closure, TEDs, and finfish bycatch.

Dr. Richard Woodward is an expert in the area of dynamic optimization and sustainability. He has conducted analysis on resource management issues including fisheries, forestry, and global warming.

Project Objective: The principal objective of this project is to improve upon existing bioeconomic analyses of the proposed red snapper rebuilding plan through 2032 by including three important issues that have not received adequate attention to date.

1. Include in the bioeconomic model, the for-hire recreational red snapper fishery.
2. Explore the impact of red snapper policies on other reef fish fisheries, particularly vermilion snapper.
3. Study the possible use of transferable rights in the red snapper recreational and commercial fisheries.

Specific Priority(ies) in Solicitation to which Project Responds: C. Red Snapper Research. 4. Management of Red Snapper.

Summary of Work: (For continuing projects, include progress to date)

Year 1: During the first year of the project we will modify the General Bioeconomic Fisheries Simulation Model (GBFSM) to include the following five vessel classes: commercial red snapper vessels with 2000 pound endorsement and with 200 pound endorsement; recreational red snapper vessels of party boats, charter boats and private boats. The model will be calibrated to the most recent commercial and recreational data for shrimp, red snapper, and vermilion snapper. We will then conduct preliminary analyses of the proposed red snapper rebuilding plan alternatives (as proposed in the "Regulatory Amendment to the Reef Fish Fishery Management Plan to Set a Red Snapper Rebuilding Plan through 2032").

Year 2: During the second year of the project we will conduct preliminary analyses using the model, to analyze the impact of red snapper policies on vermilion snapper. After consultations with the NMFS economists, modifications in the model and/or policies examined will be made. In addition, we will begin to develop the submodel to simulate transferable rights programs for the commercial, for-hire recreational, and private recreational sectors of the red snapper fishery. Finally we will complete the specification of GBFSM to include a transferable rights program and compare the economic and biological impacts of this program with the policies proposed in the Red Snapper Rebuilding Plan.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 57,999	\$ 64,320		\$122,319
Non-Federal	\$ 33,856	\$ 35,590		\$ 69,446
Total	\$ 91,855	\$ 99,910		\$191,765

NA97FF0041

MARFIN PROJECT SUMMARY

Project Title: Renewal of an Observer Program to Monitor the Directed Commercial Shark Fishery in the Gulf of Mexico and South Atlantic

Project Status/Duration: New X Cont Project Period: 12 Months

Name, Address, and Telephone Number of Applicant:

George H. Burgess
University of Florida
Gainesville, FL 32611

Principal Investigator(s) and Brief Statement of Qualifications:

George H. Burgess: 25 years in marine biological research, ichthyology specialty including elasmobranchs

Project Objective: To continue a cooperative shark resource data collection system to enhance the reliability of management strategies for the fishery of the Atlantic Ocean

Specific Priority(ies) in Solicitation to which Project Responds: 5. General - improved understanding and management of fishery data collection, management, analysis, and conservation

Summary of Work: (For continuing projects, include progress to date) This program will re-establish and expand a cooperative shark resource data collection system designed to enhance the reliability of subsequent management strategies for the shark fishery of the Atlantic, providing accurate data on species composition and fishery effort as well as ground-truthing to mandatory logbooks. Objectives are: 1) renew and expand an established observer program aboard cooperating shark fishing vessels during two semi-annual fishing seasons in the So. Atlantic (NC & Atlantic FL) and Gulf of Mexico (Gulf FL & LA), 2) provide baseline characterization data on the species composition, relative abundance, and size composition within species for the "large" and "small coastal" shark species groups by depth and season in each regional fishery, 3) increase the knowledge of the biology of the important species taken in the fishery, and 4) disseminate pertinent information about the program, as necessary and requested, to various management, scientific, and public interest groups.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$149,910			\$149,910
Non-Federal				
Total	\$149,910			\$149,910

NA87FF0427

MARFIN PROJECT SUMMARY

Project Title: Stock Structure in Dolphin, *Coryphaena hippurus*, in the Western Central Atlantic, as Determined by Molecular Genetics Techniques

Project Status/Duration: New X Cont Project Period: 36 Months

Name, Address, and Telephone Number of Applicant:

Dr. Robert W. Chapman
Marine Resources Research Institute
PO Box 12559
Charleston, SC 29422-2559
Phone: (843) 762-5051

Principal Investigator(s) and Brief Statement of Qualifications:

Robert W. Chapman, Ph.D.; Associate Marine Scientist, MRRI; extensive molecular/population genetics experience

George R. Sedberry, Ph.D.; Associate Marine Scientist, MRRI; extensive fisheries research experience

Hazel Oxenford, Ph.D.; Lecturer; University of the West Indies; extensive fisheries research experience

Brian Luckhurst, Ph.D.; Chief of Fisheries; Government of Bermuda; extensive fisheries research experience

Project Objective: To identify the stock structure of dolphin in the Western Central Atlantic upon genetic analysis of mitochondrial and nuclear DNA. To examine the genetic variation within and among populations of this species. To test the hypothesis that two distinct population or stocks exist within region.

Specific Priority(ies) in Solicitation to which Project Responds: 3. Coastal Migratory Pelagic Fisheries. Subsection b. Assessment and management models for coastal pelagics; and f. Information on populations of coastal pelagics concerning population size, age, and movement patterns.

Summary of Work: (For continuing projects, include progress to date) Previous studies of dolphin have suggested that two distinct stocks (a northern and southern) exist in the Western Central Atlantic. This hypothesis will be tested using advance molecular tools. DNA will be cloned from this species and used to identify variable microsatellite loci. Mitochondrial DNA will be analyzed by restriction endonuclease digestion of the ND-1 region. Sampling will include northern and southern aggregations in the WCA and Mediterranean and New Zealand locations. The latter locations will be used as outgroups to judge the similarities and differences found in the WCA.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 87,294	\$ 90,047	\$ 85,939	\$263,280
Non-Federal	\$ 11,287	\$ 11,287	\$ 11,287	\$ 33,861
Total	\$ 98,581	\$101,333	\$ 97,226	\$297,141

NA17FF2013

MARFIN PROJECT SUMMARY

Project Title: Discrimination Among U.S. South Atlantic and Gulf of Mexico King Mackerel Stocks with Otolith Shape Analysis and Otolith Microchemistry

Project Status/Duration: New X Cont Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

University of South Alabama
Department of Marine Sciences
Life Sciences Building 25
Mobile, AL 36688
Phone: (334) 861-7316

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Robert Shipp - 35 years experience with research on systematics, age and growth, fisheries ecology, and fisheries management of numerous fish species. Co-Principal Investigator: Dr. William Patterson (Post-Doctoral Scientist) - 10 years experience with research on age and growth, population dynamics, fisheries ecology, and otolith microchemistry

Project Objective: This interdisciplinary, interstate effort expands on our previous investigations of king mackerel stock structure and mixing rates. The central goal of the project is to provide scientific information critical to the effective management and conservation of U.S. south Atlantic and Gulf of Mexico king mackerel stocks. The primary objective is to develop natural tags based on otolith microchemistry and shape analyses that will 1) be employed to estimate the relative contribution of each stock to the winter fishery off southeastern Florida, as well as region-specific mixing proportions around peninsular Florida in winter, and 2) establish methods enabling annual estimation of stock mixing to facilitate more effective management of U.S. king mackerel stocks.

Specific Priority(ies) in Solicitation to which Project Responds: 1. A. (2) assessment of fish stocks significantly impacted by shrimp trawler bycatch; 4. e. information on populations of coastal pelagics overwintering off North Carolina, South Carolina, Georgia, and Florida, especially concerning population size, age and movement patterns. Calculate the mixing rates for Atlantic/Gulf king mackerel on an annual basis.

Summary of Work: (For continuing projects, include progress to date) For U.S. south Atlantic and Gulf of Mexico king mackerel, we will: 1) determine natural tags based on otolith shape and microchemistry analyses of each stock in summer when stocks are separate; 2) estimate the relative contribution of each stock to the winter mixed fishery in south Florida based on stock-specific tags developed from otolith shape and microchemistry analyses; 3) estimate the region specific mixing proportions of each stock around peninsular Florida in winter with otolith shape and microchemistry analyses; and 4) compare results obtained from otolith shape and microchemistry analysis methods to determine which technique is most powerful and/or cost effective. All work will be accomplished by PI Shipp, Co-PI Patterson, a master's level graduate, an undergraduate student worker. Additionally, Research Fishery Biologists at the Panama City, Florida, NMFS laboratory will contribute to the project by facilitating collection of otolith samples, aiding in estimating ages of otolith samples, and in development of otolith shape analysis protocols.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 78,398	\$ 89,672		\$168,070
Non-Federal	\$ 6,359	\$ 6,359		\$ 12, 718
Total	\$ 84,757	\$ 96,031		\$180,788

NA17FF2882

MARFIN PROJECT SUMMARY

Project Title: Fishery and Population Characteristics of wahoo, *Acanthocybium solandri*, in Florida and Adjacent Waters of the Western North Atlantic Ocean

Project Status/Duration: New X Cont **Project Period:** 36 Months

Name, Address, and Telephone Number of Applicant:

Florida Marine Research Institute
100 Eighth Avenue Southeast
St. Petersburg, FL 33701
Phone: (727) 896-8626

Principal Investigator(s) and Brief Statement of Qualifications:

Richard S. McBride (Ph.D.) And Michael D. Murphy (M.S.)

30+ combined years of research experience; 30+peer-review publications on fish biology, life history, fishery research

Project Objective: This proposed research will: 1) characterize the landings, effort, and value of Florida's wahoo fishery; 2) assess impacts of bag limits on total catch and landings of wahoo; 3) produce age-length keys and growth models for wahoo using validated aging methods; 4) describe wahoo size and age at maturity and spawning seasonality; 5) estimate wahoo fecundity and spawning frequency; and 6) synthesize Florida's fisheries information and life history parameters with other regions in the western North Atlantic, Caribbean Sea, and Gulf of Mexico.

Specific Priority(ies) in Solicitation to which Project Responds: D. coastal Migratory Pelagic Fisheries: to examine 'basic biostatistics for wahoo to develop age-length keys and maturation schedules for stock assessments and to evaluate stock structures' and 'impacts of bag limits on total catch and landings of wahoo'.

Summary of Work: (For continuing projects, include progress to date) In this new project we will summarize the available fishery data for wahoo, complete a bag limit analysis, and synthesize new and published information about wahoo life history. The fishery databases to be examined are: the Florida Marine Fisheries Information System, the Trip Interview Program, and the Marine Recreational Fisheries Statistics Survey. Wahoo will be collected throughout the year from various fishing ports along Florida's east coast. Fish sizes will be related to fish sex and age, to investigate growth patterns and longevity. Various aging methods will be screened and the most successful will be used for routing aging. Fecundity will be estimated from weighed sub-samples of oocytes in final maturation, and spawning frequency will be estimated from post-ovulatory follicles observed in histological preparations. Reproductive seasonality and size/age at maturity will be characterized from gonad-somatic indices and patterns of gametogenesis revealed in histological preparations.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 57,056	\$ 61,278	\$64,367	\$182,701
Non-Federal	\$ 16,429	\$ 16,488	\$16,780	\$ 49,697
Total	\$ 73,485	\$ 77,766	\$81,147	\$232,398

MARFIN PROJECT SUMMARY

Project Title: Genetic Analysis of Wahoo, *Acanthocybium solandri*, Stock Structure in the Western Atlantic and Gulf of Mexico by Means of Nuclear and Mitochondrial DNA markers

Project Status/Duration: New X Cont **Project Period:** 24 Months

Name, Address, and Telephone Number of Applicant:

Dr. John D. Baldwin
Division of Biological Sciences
Florida Atlantic University
2912 College Avenue
Davie, FL 33314
Phone: (954) 236-1151

Principal Investigator(s) and Brief Statement of Qualifications:

John D. Baldwin, Ph.D., Div. of biological Sciences, Florida Atlantic University. Reproduction and population genetics of aquatic organisms
Brian W. Bowen, Ph.D., Dept. of Fisheries and Aquatic Sciences, University of Florida. Conservation genetics of aquatic organisms

Project Objective: The goal for this project is to resolve stocks of wahoo, *Acanthocybium solandri*, along the Atlantic coast, Gulf of Mexico, Bahamas, and greater Caribbean utilizing seven demonstrated high resolution genetic markers; mitochondrial DNA (mtDNA) sequence data, RFLP analysis of two nDNA loci, and microsatellite analysis of four hypervariable nDNA loci.

Specific Priority(ies) in Solicitation to which Project Responds: This research proposal addresses Project Funding Priority D"Coastal Migratory Pelagic Fisheries". Specifically, this proposal addresses current high priorities 1), 5), and 7).

Summary of Work: (For continuing projects, include progress to date) There is surprisingly little scientific information on the biology of *A. solandri*. Like other members of the family Scombridae, which includes the mackerels and tunas, wahoo inhabit tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. The proposed research plan is a test of stock structure in wahoo of the western North Atlantic, including multiple sample locations on the Atlantic coast of the southeast U.S., the Gulf of Mexico, adjacent sites in the Bahamas, West Indies, and the Caribbean coast of Central America. Tissue samples will be collected for stock resolution utilizing high-resolution genetic markers, and pertinent biological data (including standard size measurements, weight, and sex) will be documented. Population genetic data will include mtDNA cytochrome b gene sequences, RFLP analysis of two nDNA loci, and microsatellite analysis of four nDNA loci. These approaches have previously proven successful for resolving stock structure in other members of the suborder Scombroidei and Teleostei such as mackerels, tunas, and billfishes. Our preliminary studies demonstrate that all seven loci will provide an appropriate level of resolution for defining stock structure in wahoo. Recent advances in the application of such data to derivation of spatial geography, population structure, and management guidelines will be applied to examine the relationships among *A. solandri* populations. We will analyze data from all *A. solandri* samples collected during the project with an analysis of molecular variance, an exact test of population structure, several models for assessing migration rates among populations, and standard indices of genetic diversity. The direct results of our proposed research will include a comprehensive genetic survey of *A. solandri* encompassing its distribution in the western Atlantic and Gulf of Mexico thereby providing one of the essential foundations for wahoo management. These data will be appropriate for integration with results from other researchers and agencies and serve to refine those models for management plans by the appropriate agencies.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 91,000	\$ 74,276		\$165,276
Non-Federal				
Total	\$ 91,000	\$ 74,276		\$165,276

NA17FF2883

MARFIN PROJECT SUMMARY

Project Title: Identifying Spawning Grounds and Classifying Nursery Habitat for Red Drum *Sciaenops ocellatus* in Pamlico Sound, NC

Project Status/Duration: New X Cont Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

Dr. Peter S. Rand
115 David Clark Labs
Department of Zoology
NC State University
Raleigh, NC 27695-7617

Principal Investigator(s) and Brief Statement of Qualifications:

Peter S. Rand, Ph.D., Fisheries Science; Cynthia M. Jones, Ph.D., Fisheries Science

Project Objective: We propose to investigate two inter-related areas of research to improve our understanding of red drum, *Sciaenops ocellatus*, life history patterns in coastal North Carolina. Specifically we intend to 1) identify and delineate spawning grounds in select regions in Pamlico Sound and 2) classify nursery grounds by determining whether there are unique microchemical signatures in otoliths of juvenile red drum captured in habitats fringing Pamlico Sound.

Specific Priority(ies) in Solicitation to which Project Responds:

Groundfish and Estuarine Fishes - Red Drum

Summary of Work: (For continuing projects, include progress to date) Over a two-year period, we will determine whether adult red drum exploit both coastal river mouth and tidal pass inlet habitats for spawning through extensive field surveys. We will examine the microchemical characteristics in the core of otoliths in young of year red drum settled in nursery ground habitats to identify the salinity of water at the time of hatching. This could provide more compelling evidence that the coastal river mouth spawning grounds are making contributions to recruitment of settled juveniles. Furthermore, it should provide a measure of the magnitude of that recruitment relative to juveniles that originated from inlet and shelf waters. Finally, we will examine microchemical signatures at the outer edge of the otoliths from young of year fish to provide a means of classifying estuarine nursery habitats. This could lay the groundwork for classifying adults to natal estuarine habitat, leading to novel insights into stock structure and migration patterns. This information could lead to a straightforward method of identifying important habitats supporting critical early life history stages of red drum, and perhaps other estuarine dependent species of concern, in the south Atlantic region.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$167,000	\$157,295		\$324,295
Non-Federal	\$ 36,036	\$ 36,936		\$ 72,972
Total	\$203,036	\$194,231		\$397,267

NA17FF2884

MARFIN PROJECT SUMMARY

Project Title: Red Drum in South Carolina Waters: The Use of Bottom Longline Gear to Develop Indices of Relative Abundance of Adults in Coastal and Near Shore Waters

Project Status/Duration: New X Cont **Project Period:** 24 Months

Name, Address, and Telephone Number of Applicant:

Dr. Charles A. Wenner
SC Dept. of Natural Resources
PO Box 12559
217 Ft. Johnson Road
Charleston, SC 29422
Phone: (843) 762-5080

Principal Investigator(s) and Brief Statement of Qualifications:

Charles Wenner - MA, Ph.D. in Marine Science from College of William and Mary (VIMS); 30+ years experience in fisheries including research surveys; age, growth, reproduction; former member of several ASMFC Technical Committees including red drum, spotted seatrout, weakfish, Atlantic croaker

Project Objective: The goal of the proposed research is to generate fishery independent indices of abundance of adult red drum in the coastal ocean and estuarine waters of South Carolina

Specific Priority(ies) in Solicitation to which Project Responds: Investigating the size and age composition of adult red drum in the ocean will provide information on mixing, the extent of migratory activity and complement data on fishing mortality and emigration rates developed from estuarine tagging programs. This information is crucial for future stock assessment work.

Summary of Work: (For continuing projects, include progress to date) The following objectives have been developed to meet the research goal:

1. To conduct fishery independent longline sampling on adult red drum to develop information on catch per unit effort (CPUE), size, age and sex composition.
2. To tag adult red drum for the collection of migratory and stock identification data.
3. To determine the age composition and reproductive status of red drum <90 cm total length (TL).
4. To tag and measure small and large coastal sharks caught incidentally to red drum sampling for inclusion in the COASTSPAN (Cooperative Atlantic States Shark Pupping and Nursery Survey) data base.
5. To disseminate accomplishments and results to the ASMFC and NMFS for inclusion in stock assessment efforts.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 75,679			\$ 75,679
Non-Federal				
Total	\$ 75,679			\$75,679

NA17FF2885

MARFIN PROJECT SUMMARY

Project Title: Atlantic Croaker, *Micropogonias undulatus*, Along the Middle Atlantic Coast and Southeast Coast of the United States

Project Status/Duration: New X Cont **Project Period:** 36 Months

Name, Address, and Telephone Number of Applicant:

Dr. Charles A. Wenner
SC Department of Natural Resources
PO Box 12559
217 Ft. Johnson Road
Charleston, SC 29422
Phone: (843) 762-5051

Principal Investigator(s) and Brief Statement of Qualifications:

MA, Ph.D. in Marine Science from College of William and Mary (VIMS); 30+ years experience in fisheries including research surveys; age, growth, reproduction; former member of several ASMFC Technical Committees including red drum, spotted seatrout, weakfish, Atlantic croaker

Project Objective: To provide pertinent new information on the biology of Atlantic croaker along the east coast of the United States for future stock assessments of this valuable resource.

Specific Priority(ies) in Solicitation to which Project Responds: Project will provide life-history information on Atlantic croaker in middle and south Atlantic, including abundance and distribution.

Summary of Work: (For continuing projects, include progress to date) The proposed project will:

- (1) Re-evaluate the interpretation of trasverse sections of sagittal otoliths for age determination
- (2) Host a workshop directed at aging problems of Atlantic croaker
- (3) Calculate growth equations from the resulting size-at-age data
- (4) Update maturity schedules throughout the region
- (5) Generate cohort-specific indices of abundance of Atlantic croaker caught during the NMFS Albatross IV fall groundfish survey cruises for the "tuning" of age-structured population models
- (6) Examine the parasitic fauna of Atlantic croaker along the east coast of the United States to determine if there are latitudinal differences in the species composition that may be compared to the findings of genetic analysis
- (7) Provide a final report summarizing our findings
- (8) Distribute all data sets to the Atlantic croaker Technical Committee of the ASMFC for subsequent inclusion in future assessments
- (9) Make available age data sets from resource surveys to NMFS at Woods Hole, MA

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 72,262	\$ 74,540	\$ 76,930	\$223,732
Non-Federal				
Total	\$ 72,262	\$ 74,540	\$ 76,930	\$223,732

MARFIN PROJECT SUMMARY

Project Title: Relationships between Estuarine Habitat Structure and the Spatial Distribution and Abundance of Juvenile Fishery Species in Charlotte Harbor, Florida (Pilot Study)

Project Status/Duration: New X Cont Project Period: 12 Months

Name, Address, and Telephone Number of Applicant:

Florida Fish & Wildlife Conservation Commission
Florida Marine Research Institute
100 Eighth Avenue SE
St. Petersburg, FL 33701
Phone: (727) 896-8626

Principal Investigator(s) and Brief Statement of Qualifications:

Shannon Whaley (M.S.), Associate Research Scientist at Florida Marine Research Institute, has been researching fishery species utilization of estuarine habitats throughout the Gulf of Mexico for nine years. She has also been involved in the adaptive management of forest ecosystems in the Pacific Northwest using Geographic Information Systems (GIS). James Burd (M.S.), Assistant Research Scientist at Florida Marine Research Institute, has been developing environmental GIS applications and databases for over seven years. His research has focused on how metrics of landscape structure are influenced by changes in scale.

Project Objective: This proposed research will: 1) identify relationships between estuarine habitat structure and the spatial distribution and abundance of selected juvenile fishery species on an estuary-wide scale, 2) create a GIS model to predict the abundance of juvenile fishery species over shallow portions (<1.5m depth) of an estuary using identified relationships among fishery species abundance, habitat structure, and environmental variables, and 3) test these methods by evaluating the predictive power of the model using validation and cross-validation methods.

Specific Priority(ies) in Solicitation to which Project Responds:

F. Essential Fish Habitat (EFH): 2.&3. Develop scientific data for the identification and refinement of EFH and Habitat Areas of Particular Concern (HAPC) for the various life stages of Federally managed species. 4. Develop GIS mapping protocols and tools to allow the presentation of EFH, HAPC, fishery distribution information, and other relevant data for the southeastern United States.

Summary of Work: (For continuing projects, include progress to date) We propose to develop methods using ordination and GIS to examine the relationships between estuarine habitat structure and the spatial distribution and abundance of several juvenile fishery species (e.g. spot, croaker, mullet, sea trout, red drum, and pink shrimp). To test the efficacy of these techniques, this pilot study will focus on the utilization of shallow-water (<1.5m depth) estuarine habitats by juvenile fishery species in Charlotte Harbor, Florida. Using GIS habitat layers, numerous habitat structure parameters will be derived and associated with sites sampled throughout Charlotte Harbor by Florida's Fishery Independent Monitoring program over the past ten years. Ordination techniques will identify relationships among fishery species abundance, habitat structure, and environmental variables. These relationships will be incorporated into a GIS model that predicts the distribution and abundance of juvenile fishery species over shallow portions of the estuary. The predictive power of the model will be assessed using several model validation techniques. The final model will be demonstrated to local management and conservation organizations to evaluate its potential for incorporation into existing decision making processes involving estuarine habitat conservation and restoration.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 41,153			\$ 41,153
Non-Federal	\$ 19,238			\$ 19,238
Total	\$ 60,391			\$ 60,391

MARFIN PROJECT SUMMARY

Project Title: GIS Analysis of Fishery-Dependent Data in Relation to Definition of Essential Fish Habitat, Habitat Areas of Particular Concern, and Marine Protected Areas in the South Atlantic Bight

Project Status/Duration: New X Cont **Project Period:** 24 Months

Name, Address, and Telephone Number of Applicant:

George R. Sedberry
SC Department of Natural Resources
PO Box 12559
217 Ft. Johnson Road
Charleston, SC 29422
Phone: (843) 762-5051

Principal Investigator(s) and Brief Statement of Qualifications:

George R. Sedberry: Ph.D. in marine science; 22 years research experience in South Atlantic Bight (fish, fisheries, GIS)

John C. McGovern: Ph.D. in marine science; 15 years research experience with southeastern marine fishes

Philip Weinbach: M.S. in geographic analysis; 5 years research experience with GIS analysis of SAB ecosystems

Project Objective: Format existing MARMAP fishery-independent trawl, trap, longline, hydrographic and ichthyoplankton data into an ACCESS database that can be incorporated into a GIS; integrate with existing SEAMAP bottom mapping database to relate fish distribution with habitat type and hydrographic parameters; perform spatial analyses to determine the relationships among distribution of larval, juvenile, adult and spawning fish with bottom and hydrographic features; incorporate GIS and database into a web-based framework made available to more effectively plan future mapping,, exploration, and management in the South Atlantic Bight.

Specific Priority(ies) in Solicitation to which Project Responds:

B. Reef Fish. 3. Management of reef fish. (b) Identification of prime sites for the establishment of reserves in the U.S. south Atlantic

F. Essential Fish Habitat. 4. Develop GIS mapping protocols and tools to allow the presentation of EFH, HAPC, fishery distribution information, and other relevant data for the southeastern United States

Summary of Work: (For continuing projects, include progress to date)

Data from several sources will be used to examine spatial trends in abundance, biomass, diversity and distribution of fishes of the continental shelf and upper slope from about Cape Hatteras, NC to West Palm Beach, FL. A GIS will be developed by expanding an existing database built on MARMAP fishery-independent trawl data. The GIS will examine historical and current databases for areas that might be considered Essential Fish Habitat, Habitat Areas of Particular Concern, and Marine Protected Areas. Data to be incorporated include region-wide fishery-independent trawl surveys (1973-1987), region-wide fish trap surveys (1978-2002), ichthyoplankton surveys (1973-2002), data on reproductive biology of reef fishes compiled by the MARMAP program, and SST and color satellite imagery. GIS analysis will be aimed at mapping areas of high abundance, biomass and diversity, by determining locations that are above the mean value of these parameters for the region. In addition, the GIS will provide maps of distribution and relative abundance of priority reef fish species (e.g. snappers, groupers), and locations where spawning has been documented. The MARMAP ichthyoplankton database will be examined for spatial and temporal patterns in occurrence of larvae of priority reef fishes, which will indicate spawning and/or recruitment areas. Data layers will also include dominant oceanographic features of the region, which will be described in relation to fish distribution. The GIS will be built upon existing MARMAP GIS and SEAMAP bottom mapping efforts. Data layers and metadata will be incorporated to allow investigators to examine species composition, habitat quality and other data that exist for SEAMAP habitat cells. The GIS product will be made available on

CD-ROM, and incorporated into the OPIS on-line interactive GIS at the NOAA Coastal Services Center in Charleston. Results will be compared to potential MPA sites being considered by the SAFMC. While potential MPA sites have been chosen by the SAFMC with specific fishery management criteria for reef fishes in mind, preliminary spatial analysis of MARMAP trawl have indicated that additional analyses of existing data are needed and that GIS protocols should be developed with consideration of EFH, HAPC and MPAs in mind.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 95,000	\$ 98,786		\$193,786
Non-Federal	\$ 16,112	\$ 16,112		\$ 32,224
Total	\$111,112	\$114,898		\$226,010

MARFIN PROJECT SUMMARY

Project Title: An Integrated Economic Analysis of Alternative Bycatch, Commercial, and Recreational Policies for the Recovery of Gulf of Mexico Red Snapper.

Project Status/Duration: New ☐ Cont. ☒ **Start:** January 1, 1999 **End:** December 31, 2000

Name, Address, and Telephone Number of Applicant:

Dr. Richard T. Woodward
Dept. of Agricultural Economics
Texas A&M University
College Station, TX 77843-2124
Phone: (409) 845-5864; e-mail: r-woodward@tamu.edu

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Richard Woodward is an expert in the area of dynamic optimization and sustainability. He has conducted analysis on resource management issues including fisheries, forestry and global warming. Dr. Wade L. Griffin possesses a wealth of experience in fishery economics. He has completed twenty-three projects related to the Gulf of Mexico, some of which include real effort measurement, Texas closure, TED's, finfish bycatch, and recreation demand.

Project Objective: The primary goal of this project is to conduct an economic analysis of alternative policies aimed at increasing red snapper stock levels in the Gulf of Mexico. The new bycatch-reduction policies are fractional license, fractional gear, and the buy-back of shrimp licenses. These will be compared with traditional bycatch-reduction policies (BRD's and closures) and policies directed towards the red snapper fishery including variable commercial and recreational quotas, trip limits, limited entry in the commercial fishery and bag and size limitations in the recreational fishery. The specific objectives are: (1) Modify the General Bioeconomic Fisheries Simulation Model (GBFSM) to include fractional license and fractional gear policies in the shrimp fishery and variable quotas in the red snapper fishery. (2) Using GBFSM, estimate the present value of the net gains associated with alternative bycatch and red snapper fishery policies. (3) Based on GBFSM, develop a dynamic optimization model that incorporates a sustainability criterion. (4) Using the dynamic-sustainability model, identify the policy paths that would satisfy three alternative objectives: the minimization of the cost to achieve the goal of a 20% SPR by the year 2019; maximization of the present value (PV) of the fishery; and the optimal policy that satisfies an economic sustainability criterion. (5) Estimate the increase in red snapper stocks associated with alternative fixed and flexible bycatch and red snapper fishery policies. (6) Based on the results obtained, develop policy guidelines for setting the optimal levels of bycatch reduction and commercial and recreational fishing quotas.

Specific Priority(ies) in Solicitation to which Project Responds: This proposal responds to priorities 1f(1&2) that relate to the economic considerations of bycatch reduction. The proposal considers both the issues of optimal bycatch reduction 1f(1) and alternatives to gear and season/area restrictions 1f(2).

Summary of Work:

Year 1: Incorporate new bycatch reduction policies into GBFSM (Objective 1). Evaluate the relative economic merits of the alternative policies for the recovery of the red snapper stocks (Objective 2). Begin the development of a dynamic optimization model of the Gulf shrimp and red snapper fisheries (Objective 3).

Year 2: Complete the specification of the dynamic optimization model (Objective 3). Conduct optimality analysis to identify cost efficient policies that achieve the goal of an SPR of 20%, and policies that are consistent with economic sustainability (Objective 4) and incorporate those results into GBFSM. Develop policy guidelines (Objective 6) and write final report.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$40,000	\$48,589		\$88,589
Cost Sharing	\$27,546	\$26,147		\$53,693
Total	\$67,546	\$74,736		\$142,282

MARFIN PROJECT SUMMARY**Project Title:** Intercept Surveys of Recreational Spiny Lobster Fishermen in the Florida Keys**Project Status/Duration:** New X Cont **Project Period:** 12 Months**Name, Address, and Telephone Number of Applicant:**

William C. Sharp
 Florida Fish & Wildlife Conservation Commission
 Florida Marine Research Institute
 South Florida Regional Laboratory
 2796 Overseas Highway, Suite 119
 Marathon, FL 33050
 Phone: (305) 289-2330

Principal Investigator(s) and Brief Statement of Qualifications:

William Sharp, Assistant Research Scientist. William Sharp has 10 years experience conducting research on the life history of the spiny lobster and with the management of the commercial and recreational fisheries of the species in south Florida. John H. Hunt, Research Administrator. John Hunt has 20 years experience conducting research on the life history of the spiny lobster and with the management of the commercial and recreational fisheries of the species in south Florida. Rodney D. Bertelsen, Assistant Research Scientist. Rodney Bertelsen has more than 10 years experience conducting research on the life history of the spiny lobster in south Florida and in conducting mail surveys of recreational lobster fishermen.

Project Objective: The goal of the proposed project is to acquire information on the Florida recreational spiny lobster fishery by conducting intercept surveys of recreational lobster fishermen. The study will collect catch, effort, and demographic data that will be used to evaluate the accuracy of similar data generated by the Florida Fish & Wildlife Conservation Commission's (FWC) mail surveys, which are the primary source of information on the recreational fishery. The recreational fishery is experiencing increased scrutiny due to its apparent growth. Results from the proposed study will aid the FWC in developing management options for limiting the potential for growth in this fishery.

Specific Priority(ies) in Solicitation to which Project Responds: 7c. Design and evaluation of innovative approaches to fishery management with special attention given to approaches that control access to specific fisheries.

Summary of Work: (For continuing projects, include progress to date) The proposed work will entail conducting intercept surveys of recreational lobster fishermen throughout the Florida Keys during the Special Two-Day Sport Season and during the first month of the regular season during the 2002 fishing season. Lobster fishermen fishing in the Florida Keys will be surveyed at public boat ramps, rental boat dealers, docked charter boats, and from shore as they complete their fishing trips. Lobster landings, fishing effort, demographic, and lobster length-frequency data will be collected from each interview. The landings, effort, and demographic data gathered from these intercept surveys will be compared statistically to similar data generated by FWC mail surveys. Length frequency data are vital to convert recreational landings estimated from the mail surveys, which are in numbers of lobsters, to an estimate of weight using a morphometric conversion that allows a direct comparison with commercial landings. To date there has been no mechanism for collecting length frequency data on recreational lobster landings. Consequently, the FWC has used length frequency data collected annually from commercial landings and assumed that no difference exists between the mean size of lobsters landed by each fishery. Length-frequency data collected during the proposed intercept surveys can be directly compared to data collected from the commercial fishery to evaluate this assumption.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$39,017			\$39,017
Non-Federal	\$17,546			\$17,546
Total	\$56,563			\$56,563

NA17FF2868

MARFIN PROJECT SUMMARY

Project Title: An Intertemporal and Spatially Dynamic Supply Model of the Gulf of Mexico Shrimp Fleet for Use in Management and Bycatch Reduction

Project Status/Duration: New X Cont **Project Period:** 36 Months

Name, Address, and Telephone Number of Applicant:

Board of Supervisors
Louisiana State University & Agricultural and Mechanical College
Office of Sponsored Programs
330 Thomas Boyd Hall
Baton Rouge, LA 70803-2701
Phone: (225) 578-3386

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. Walter R. Keithly, Jr., Associate Professor, School of the Coast & Environment
Dr. Richard Kazmierczak, Jr., Associate Professor, Department of Agricultural Economics

Project Objective: The overall purpose of this study is threefold: (1) to develop defensible parameter estimates that can assist in explaining changes in the behavior of shrimp fishermen in relation to economic stimuli and/or potential management measure, (2) to develop more defensible measures of effort and bycatch, and (3) to use these parameter estimates to forecast levels of bycatch at a temporal and spatial scale.

Specific Priority(ies) in Solicitation to which Project Responds:

- 1.f(1) economic considerations of bycatch reduction
- 7. General

Summary of Work: (For continuing projects, include progress to date) Secondary data, including the NMFS Vessel Operating Unit File and the NMFS Shrimp Landings File, will be used to accomplish the objectives set forth in this three-year research proposal. Specifically, the changes in the behavior of Gulf of Mexico shrimp fishermen in response to economic stimuli and management measures will first be derived using microeconomic and econometric considerations. These parameter estimates derived from this analysis will then be used to develop a joint production function that will allow one to examine expected changes in bycatch in relation to the changes in behavior of shrimp fishermen due to changes in economic stimuli or management measures.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 94,970	\$106,274	\$ 85,989	\$287,233
Non-Federal	\$ 42,745	\$ 43,558	\$ 42,098	\$128,401
Total	\$137,715	\$149,832	\$128,087	\$415,634

MARFIN PROJECT SUMMARY

Project Title: Economic Valuation of Marine Reserves in the Florida Keys as Measured by Diver Attitudes and Preferences: Implications for Valuation of Non-Consumptive Uses of Marine Resources

Project Status/Duration: New X Cont **Project Period:** 15 Months

Name, Address, and Telephone Number of Applicant:

Rosenstiel School of Marine & Atmospheric Sciences
4600 Rickenbacker Causeway
Miami, FL 33149
Phone: (225) 361-4608

Principal Investigator(s) and Brief Statement of Qualifications:

Dr. David Letson. Associate Professor of Marine Affairs and Economics. Expertise in natural resource economics, fisheries economics, and contingent valuation. Research and teaching experience in contingent valuation studies, pollution prevention, and fisheries socioeconomics.

Project Objective: To determine the value of a non-consumptive activity, diving, on marine reserves-as measured by contingent valuation and user attitudes-and to identify the factors that either enhance or reduce marine reserve value, by addressing the following: Determining the monetary value that divers place on (and are willingness-to-pay for) individual marine reserves in the Florida Keys; ranking the attributes offered by the marine reserves that enhance diver visitation and satisfaction; and, developing a matrix that evaluates diver preferences for individual marine reserves.

Specific Priority(ies) in Solicitation to which Project Responds: General Priority 9. Studies to evaluate the value of non-consumptive uses of marine resources, especially as related to diving activities and marine reserves.

Summary of Work: (For continuing projects, include progress to date) As marine reserves become more important in both the Gulf of Mexico and South Atlantic region (as evidenced by the South Atlantic Fishery Management Council's Spring 2000 scoping meetings on the marine reserves and the Gulf of Mexico Fishery Management Council's participation in and passage of the Dry Tortugas Ecological Reserve), their uses may often offer both fishery and non-fishery benefits. Diving is definitely one such non-fishery benefit, but it can only be evaluated best if its total benefits can be determined and contrasted against its total costs.

Using contingent valuation in a survey questionnaire format, the project will determine the value placed on six marine reserves in the Florida Keys National Marine Sanctuary by divers. The project will also collect information on travel costs and user attitudes and preferences, to complete a comprehensive view of diver valuation and preferences. The reserves selected shall elucidate the effects of partial and total closures to other consumptive activities, as well as the effects of other natural attributes. Results from the study will be shared with NMFS scientists at the Southeast Fisheries Center, as well as regional council panels, to assist in the future site designations and determination of allowable activities.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 81,040	\$ 6,683		\$ 87,723
Non-Federal	\$ 16,856	\$ 1,390		\$ 18,246
Total	\$ 97,896	\$ 8,073		\$105,969

NA17FF2877

MARFIN PROJECT SUMMARY

Project Title: Factors Affecting Participation in Marine Fisheries: Case Studies in Georgia and North Carolina

Project Status/Duration: New X Cont Project Period: 24 Months

Name, Address, and Telephone Number of Applicant:

University of Georgia Research Foundation, Inc.
621 Boyd Graduate Studies Research Center
Athens, GA 30602
Phone: (706) 542-5939

Principal Investigator(s) and Brief Statement of Qualifications:

Benjamin G. Blount; Professor of Anthropology (Ph.D. 1969). Has conducted research for six years on the Georgia coast investigating marine fisheries and fishers' perceptions of environmental issues.

Project Objective: To identify the factors in two counties (McIntosh, GA and Brunswick, NC) that have motivated commercial fishers to leave the industry and recreational fishers to begin fishing for sport and leisure.

Specific Priority(ies) in Solicitation to which Project Responds: G. General, 11. Examination of the motivational causes that determine fishing behavior

Summary of Work: (For continuing projects, include progress to date)

1st year: interviews with commercial and recreational fishers in McIntosh Co; preparation of survey form for recreational fishers and mail to 1,500 individuals. Analysis of data.

2nd year: interviews with commercial and recreational fishers in Brunswick Co., NC; preparation and mailing of survey form for recreational fishers to 4,000 individuals. Analysis of data.
Preparation of report.

	Year 1	Year 2	Year 3	Total
Project Funding:				
Federal	\$ 61,560	\$ 67,661		\$129,221
Non-Federal	\$ 30,656	\$ 31,658		\$ 62,314
Total	\$ 92,216	\$ 99,319		\$191,535